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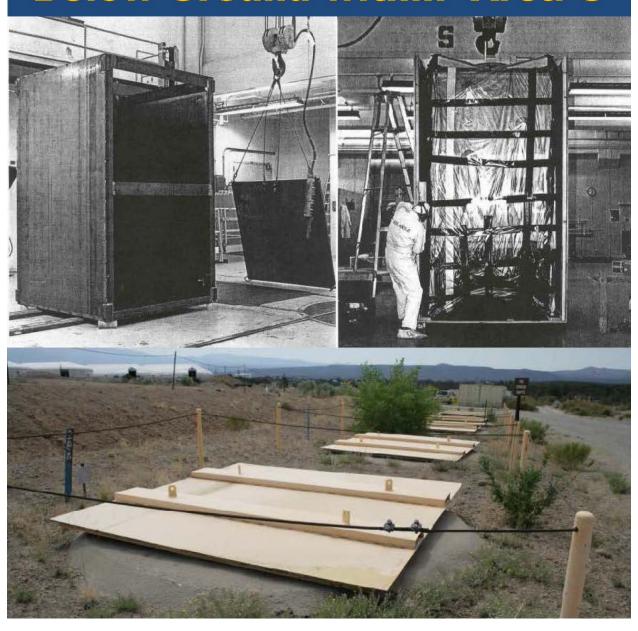
Jones, Robert Wesley Hargis, Kenneth Marshall

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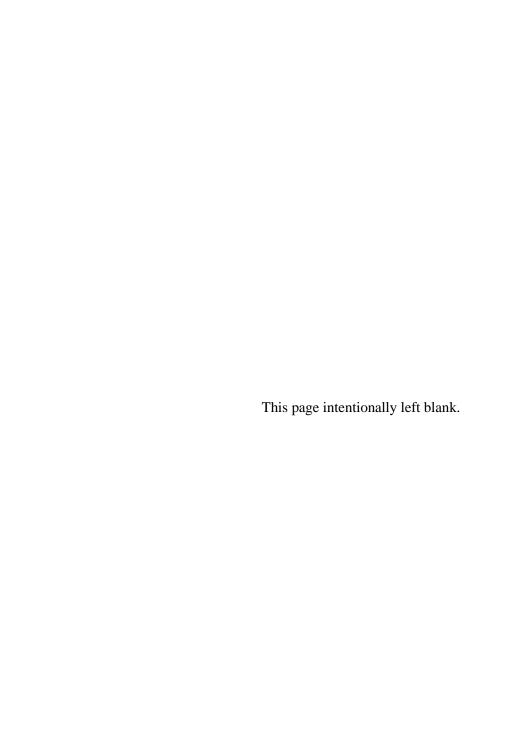
Hot Cell Liners Category of Transuranic Waste Stored Below Ground within Area G



September 2014







Hot Cell Liners Category of Transuranic Waste Stored Below Ground within Area G

Los Alamos National Security, LLC Los Alamos National Laboratory Los Alamos, New Mexico 87545

Prepared for U.S. Department of Energy under Contract No. DE-AC52-06NA25396

Prepared by:

Robert W. Jones LTP-PTS

LTP-PTS

Reviewers:

LTP

Kathryn M. Roberts

REG-SP

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Abbreviations and Acronyms

AEC Atomic Energy Commission

Am-241 americium-241 Ba-127 barium-127 BG below ground

CCP Central Characterization Project

CMP corrugated metal pipe

CMR Chemistry and Metallurgical Research Facility (Building 3-29)

Consent Order New Mexico Environment Department Compliance Order on Consent

Cs-137 cesium-137

EPA U.S. Environmental Protection Agency

Eu-155 europium-155

FGE plutonium-239 fissile gram equivalents

ft feet

FY fiscal year gallon

HSE-1 Health Physics Group HSE-7 Waste Management Group

HSE-8 Environmental Protection Group

HWN Hazardous Waste Number

LANL Los Alamos National Laboratory

m³ cubic meters MAR material at risk

MDA Material Disposal Area
MFP mixed fission products
mrem/hr millirem per hour
nCi/g nanocuries per gram

NEPA National Environmental Policy Act
NMED New Mexico Environment Department
NNSA National Nuclear Security Administration

NNSS Nevada National Security Site
PE-Ci plutonium-239 equivalent curies

Pm-147 promethium-147 Pu-238 plutonium-238 Pu-239 plutonium-239 Pu-240 plutonium-240 Pu-241 plutonium-241 Pu-242 plutonium-242 remote handled RHRh-106 rhodium-106

RSWD Radioactive Solid Waste Disposal Record

Ru-106	ruthenium-106
Sb-125	antimony-125
Sr-90	strontium-90
TA	Technical Area
Te-125	tellurium-125
TWSR	TRU Waste Storage Record
TRU	transuranic (elements with atomic number greater than 92)
U-233	uranium-233
U-234	uranium-234
U-235	uranium-235
U-236	uranium-236
VOC	volatile organic compounds
WAC	waste acceptance criteria
WIPP	Waste Isolation Pilot Plant
WPF	Waste Profile Form
Y-90	yttrium-90

1. Executive Summary

A large wildfire called the Las Conchas Fire burned large areas near Los Alamos National Laboratory (LANL) in 2011 and heightened public concern and news media attention over transuranic (TRU) waste stored at LANL's Technical Area 54 (TA-54) Area G waste management facility. The removal of TRU waste from Area G had been placed at a lower priority in budget decisions for environmental cleanup at LANL because TRU waste removal is not included in the March 2005 *Compliance Order on Consent* (Reference 1) that is the primary regulatory driver for environmental cleanup at LANL. The Consent Order is an agreement between LANL and the New Mexico Environment Department (NMED) that contains specific requirements and schedules for cleaning up historical contamination at the LANL site. After the Las Conchas Fire, discussions were held by the U.S. Department of Energy (DOE) with the NMED on accelerating TRU waste removal from LANL and disposing it at the Waste Isolation Pilot Plant (WIPP).

In January 2012, the DOE National Nuclear Security Administration (DOE/NNSA) and the NMED announced the issuance of the *Framework Agreement: Realignment of Environmental Priorities* (Framework Agreement) (Reference 2). The Framework Agreement is a non-binding agreement that outlines DOE/NNSA commitments to further accelerate TRU waste disposition at LANL. Commitments under the Framework Agreement related to TRU waste include a commitment to develop by December 31, 2012, a schedule with pacing milestones for disposition of below-ground (BG) TRU waste requiring retrieval at Area G based on project funding profiles.

Within the schedule for disposition of BG TRU waste submitted to the NMED in December 2012, the DOE/NNSA committed to disposition of six BG categories of TRU waste no later than September 30, 2018. These six categories were identified as (1) Pit 9; (2) Trenches A-D; (3) Corrugated Metal Pipes (CMPs); (4) Hot Cell Liners; (5) Tritium Packages; and (6) the 17th Remote-Handled (RH) Canister. For a seventh BG category that may require retrieval, the 33 Shafts, DOE/NNSA will complete (1) a determination as to whether this category contains TRU waste that requires retrieval; and (2) to the extent necessary, its decision process under the National Environmental Policy Act (NEPA) regarding retrieval, by no later than September 30, 2015.

As the result of a fire in an underground salt haul truck and radiological release that occurred in February 2014, the WIPP repository is shut down and is not accepting any waste shipments. A recovery plan is currently being developed but a date for resumption of waste shipments to WIPP has not been established. Preliminary guidance provided to LANL by the DOE/NNSA Los Alamos Field Office for an updated Life-Cycle Baseline for work funded by DOE Environmental Management was to assume that shipments from LANL to WIPP will resume in October 2016. Based on that assumption and expected budget targets, removal of the six categories of BG TRU would not be completed until approximately March 2021.

Detailed planning has begun on retrieval and processing of the first six categories of below-ground TRU waste, with the CMPs, Trenches A-D, Pit 9, and Hot Cell Liners as the categories to be retrieved and processed for disposition first. Because the CMPs present less of a challenge in terms of both retrieval and processing, it is likely retrieval and processing will begin with the CMPs category and retrieval will begin on containers in Trenches A-D, Pit 9, and Hot Cell Liners shafts as the CMPs are processed.

The Hot Cell Liners waste category consists of five decommissioned stainless steel alpha-containment boxes that were removed from hot cells in Wing 9 of the Chemistry and Metallurgy Research (CMR) Facility, wrapped in 3- or 4.5-mil-thick plastic, and each placed into a steel box. Each steel box is approximately six feet by six feet by ten feet (6 ft x 6 ft x 10 ft), and is fitted with lifting lugs at each corner of the top of the box so that each is readily retrievable. These boxes, because of their relatively high dose rates, were placed into five vertical shafts, 302 through 306, located in the south-central portion of Area G. The shafts are approximately eight feet in diameter and twenty-two feet deep. They are lined with corrugated metal pipe

and the bottoms are open and filled with gravel to facilitate drainage. Shaft covers were fabricated from \(^{1}\)4 inch steel with lifting rings and incorporated forklift guides for easy handling. The boxes were placed into the shafts on December 5, 1991.

The approximate volume of these five boxes is 51 cubic meters (m³) or 2.1% of the total BG volume of TRU waste that may require retrieval. The hot cell liners were decontaminated remotely before they were removed and the five containers have a total of approximately 0.6 plutonium-239 (Pu-239) equivalent curies (PE-Ci) or 0.0005% of the total Material at Risk (MAR) of the BG TRU waste that may require retrieval. The primary radionuclides identified in the Hot Cell Liners category are plutonium-239 (Pu-239), plutonium-241 (Pu-241), uranium-234 (U-234), uranium-235 (U-235), and mixed fission products (MFP).

While the five box containers are currently classified as TRU waste, historical documentation provided by the waste generator indicates four of the five Hot Cell Liners are low level waste (LLW) and the fifth one close to the limit for TRU waste. Radioassays were performed on each of the five containers in March 2014 to better determine whether the five containers should be managed as TRU waste or LLW. The resulting analysis of each radioassay showed that the five containers assayed less than the limit for TRU waste and should be reclassified to LLW. Reclassification of the containers to LLW may provide the option of leaving these containers in place (i.e. belowground) as well as the option of retrieving the containers and shipping the containers off the LANL site for disposition. This assumes that the waste generator's certification that the containers have no hazardous constituents is confirmed, and that approval for disposition of the containers as LLW at LANL can be obtained. A decision to retrieve and disposition the containers off-site as either LLW or MLLW will require characterization and verification that the containers meet the proposed off-site facility's waste acceptance criteria.

This report summarizes available information on the origin, configuration, and composition of the waste containers within the Hot Cell Liners category; their physical and radiological characteristics; the results of the radioassays; and the justification to reclassify the five containers as LLW rather than TRU waste.

2. Introduction

2.1 Purpose and Introduction

Purpose of Report. This report presents a general description of categories of TRU waste in belowground storage configurations at LANL TA-54 Material Disposal Area (MDA) G (the below-ground portion of Area G), with a detailed description of the Hot Cell Liners category of BG TRU waste. The report is intended to support work packages or statements of work for subcontracting task orders for disposition of the waste containers in the Hot Cell Liners shafts. Information is presented on the historic source of the waste stored in the Hot Cell Liners shafts, the configuration of the containers stored in Hot Cell Liners shafts, and characteristics of the Hot Cell Liners waste category.

Framework Agreement. A large wildfire called the Las Conchas Fire burned more than 150,000 acres south and west of LANL in late June and July 2011. The fire came within about 3.5 miles of TA-54, Area G, which is the primary location where LANL manages solid radioactive waste, and heightened public concern and news media attention on TRU waste storage at Area G. Following the fire, New Mexico Governor Susana Martinez asked the DOE to provide sufficient funding for cleanup of defense legacy wastes from LANL and for TRU waste disposal at WIPP.

The primary regulatory driver for environmental cleanup at LANL is the *Compliance Order on Consent* (Consent Order), a 2005 agreement between LANL and the NMED that contains specific requirements and schedules for cleaning up historical contamination of the LANL site, and has a final deliverable date of December 2015 (Reference 1). The Consent Order does not address requirements and deliverables for removing TRU waste from the LANL site, which placed TRU waste removal at a lower priority in budget decisions. Removal of TRU waste stored above ground at Area G and below ground in pits, shafts, and trenches within MDA G is required before a remedy for cleanup of MDA G can be implemented under the Consent Order. After the Las Conchas Fire, discussions were held with the NMED on accelerating TRU waste removal from LANL.

In January 2012, the DOE/NNSA and the NMED announced issuance of the *Framework Agreement: Realignment of Environmental Priorities* (Framework Agreement). The Framework Agreement is a non-binding agreement that outlines DOE/NNSA commitments to further accelerate TRU waste disposition at LANL (Reference 2). Commitments under the Framework Agreement related to TRU waste include:

- Removal of all non-cemented above-ground TRU waste stored at Area G as of October 1, 2011, by no later than June 30, 2014. This inventory was defined as 3,706 cubic meters (m³) of material;
- Removal of all newly-generated TRU waste received in Area G during FYs 2012 and 2013 by December 31, 2014;
- Based on projected funding profiles, develop by December 31, 2012, a schedule with pacing milestones for disposition of below-ground TRU waste requiring retrieval at Area G; and
- Removal of the above-ground cemented TRU waste in an efficient and effective manner protective of human health and safety of workers and the public.

Within the schedule for disposition of below-ground TRU waste submitted to the NMED in December 2012, the DOE/NNSA determined that there are seven below-ground waste unit categories within MDA G that potentially contain TRU waste that may require retrieval (Reference 3). These seven categories were identified as (1) Pit 9; (2) Trenches A-D; (3) Corrugated Metal Pipes; (4) Hot Cell Liners; (5) Tritium Packages; (6) the 17th RH Canister; and (7) the 33 Shafts. The seven categories have an approximate total volume of 2,399 m³ and approximate radioactive MAR of 110,751 PE-Ci. Of these seven categories, approximately 99.86% of the waste volume and approximately 99.9% of the MAR is

contained within the first six categories. For the remaining category, the 33 Shafts (which have a total approximate volume of 3.4 m³ and total MAR of 97 PE-Ci), the DOE/NNSA concluded that additional evaluation is warranted.

The DOE/NNSA committed to disposition the below-ground TRU waste in the first six categories no later than September 30, 2018. For the 33 Shafts, DOE/NNSA will complete (1) a determination as to whether this category contains TRU waste that requires retrieval; and (2) to the extent necessary, its decision process under NEPA regarding retrieval, by no later than September 30, 2015. As the result of a fire in an underground salt haul truck and radiological release that occurred in February 2014, the WIPP repository is shut down and is not accepting any waste shipments. A recovery plan is currently being developed but a date for resumption of waste shipments to WIPP has not been established. Preliminary guidance provided to LANL by the DOE/NNSA Los Alamos Field Office for an updated Life-Cycle Baseline for work funded by DOE Environmental Management was to assume that shipments from LANL to WIPP will resume in October 2016. Based on that assumption and expected budget targets, removal of the six categories of BG TRU would not be completed until approximately March 2021.

2.2 Background

Historical Perspective. Radioactive waste has been generated at LANL since the 1940's during research and development activities for nuclear weapons, nuclear reactors, and plutonium science. Historically, radioactive waste was buried in shallow landfills at LANL called MDAs. MDA G at TA-54 (belowground portion of Area G) first received radioactive waste in 1957 and has served as the primary radioactive solid waste management facility at LANL since 1959 (Reference 4). Figure 1 shows a high-level aerial photograph of TA-54 Area G and location of Area G on a map of LANL technical areas and the surrounding area. MDA G underlies most of the portion of Area G shown in the aerial photograph.

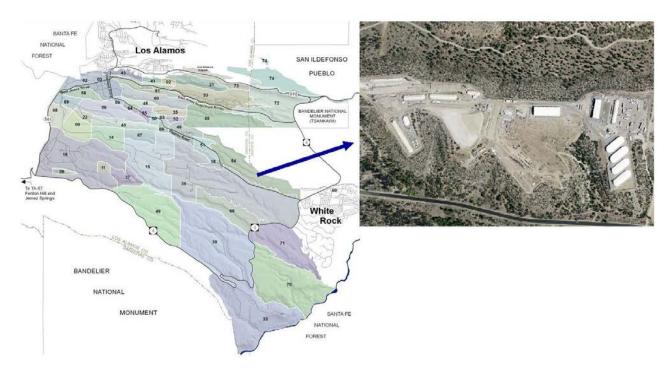


Figure 1. Location and Aerial Photo of TA-54 Area G

In 1970, the Atomic Energy Commission (AEC) issued Immediate Action Directive 0511-21 that directed AEC sites to segregate wastes with "known or detectable concentrations of transuranium nuclides" and that such wastes be "packaged and buried in such a fashion that they can be readily retrievable as contamination-free packages within an interim period of 20 years; beyond that period retrievability should continue to be possible" (Reference 5). This waste was to be stored for disposition in a future deep geologic repository (ultimately, WIPP).

The segregation limit for TRU waste was changed in 1973 with issuance of the *Atomic Energy Commission Manual*, Chapter 0511, "*Radioactive Waste Management*" to material contaminated with certain alpha-emitting radionuclides and activity greater than 10 nanocuries per gram (nCi/g) for plutonium-239 (Pu-239) and U-233. Both Pu-238 and plutonium-241 (Pu-241) were excluded unless indicated by Pu-239 impurities or when required by local burial criteria (LANL established a segregation limit for Pu-238 of 100 nCi/g). The value of 10 nCi/g was derived from the upper range of concentrations of radium-226 in the earth and was "subject to modification based on long-term studies of nuclide migration in soil" (Reference 6). In September 1982, DOE issued DOE Order 5820.1, *Management of Transuranic Contaminated Material*, which defined "TRU contaminated material" as "alpha-emitting radionuclides of atomic number greater than 92 and half-lives greater than 20 years in concentrations greater than 100 nCi/g" (Reference 7). The term "TRU waste" was defined as TRU contaminated material which has been declared as having no significant economic value or use.

This definition was essentially retained by DOE Manual 435.1, *Radioactive Waste Management Manual* (Reference 8), issued in July 1999 under DOE Order 435.1, *Radioactive Waste Management*, which stated:

"Transuranic waste is radioactive waste containing more than 100 nanocuries (3700 becquerels) of alpha-emitting transuranic isotopes per gram of waste, with half-lives greater than 20 years, except for:

- (1) High-level radioactive waste;
- (2) Waste that the Secretary of Energy has determined, with the concurrence of the Administrator of the Environmental Protection Agency, does not need the degree of isolation required by the 40 CFR Part 191 disposal regulations; or
- (3) Waste that the Nuclear Regulatory Commission has approved for disposal on a case-by-case basis in accordance with 10 CFR Part 61."

This definition of TRU waste is still applicable today, and in practice has been consistent since 1982. Waste segregated before that time may be determined not to be TRU waste under the current definition because it may have concentrations of alpha-emitting TRU isotopes with half-lives greater than 20 years that are less than 100 nCi/g or may contain radionuclides such as U-233 that are no longer included in the definition of TRU waste.

Like a number of DOE sites, LANL initially developed storage configurations for TRU waste that involved placing the waste containers in trenches, pits, and shafts that were excavated into the ground surface (Reference 4). LANL also began storing TRU waste in large fabric-covered storage domes in 1985 (white structures in the aerial photograph in Figure 1). By the time that WIPP opened in 1999, LANL had built up an inventory of about 9,100 m³ of TRU waste at Area G, with about 2,416 m³ stored below ground in trenches, pits, and shafts and about 6,700 m³ stored above ground (Reference 9).

TRU Waste Disposition. Through August 24, 2014, LANL has shipped a total of 6,848 m³ of TRU waste to WIPP or to temporary storage at the Waste Control Specialists, LLC site. Some TRU waste containers shipped to Idaho National Laboratory for characterization or size reduction and repackaging are also included. A total of 1,394 m³ of TRU waste that was reclassified to MLLW after radioassay showed TRU isotope concentrations less than 100 nCi/g has also been shipped off-site to commercial facilities for treatment and disposal at the Nevada National Security Site (NNSS) or commercial MLLW

disposal facilities. Total disposition of TRU waste through August 24, 2014, was 8,501 m³. There is not a one-to-one correlation between TRU waste volumes shipped to WIPP, or reclassified and shipped as MLLW, and inventory reduction because some containers were over-packed into standard waste boxes or repackaged into multiple drums because of their high activity.

Although the focus of shipments of TRU waste from LANL to WIPP has been on TRU waste stored above ground, LANL retrieved and shipped below-ground RH waste in 16 shafts (Shafts 236-243 and 246-253) with a total volume of about 17 m³ to WIPP in 2009. All other waste segregated and stored below ground as TRU waste remains below ground.

Below-Ground TRU Waste. Figure 2 presents a high-level aerial photograph of Area G with locations of the seven remaining below-ground waste unit categories. These locations are shaded in red and labels identify the seven waste unit categories.

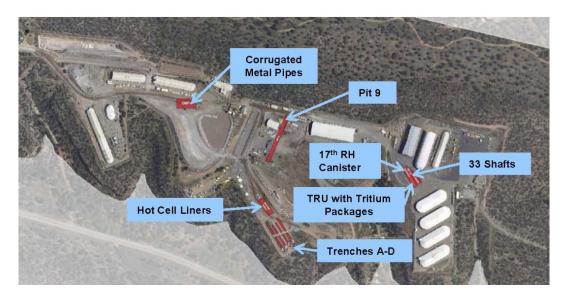


Figure 2. Aerial Photo of Area G with Below-Ground TRU Waste Storage Areas Shaded in Red

Table 1 presents a summary of the seven TRU waste unit categories stored below-ground at MDA G. The row of the table that provides information on the Hot Cell Liners category is highlighted in yellow. The table provides a general description of each category, the approximate volume of each category and the percentage each category makes up of the total volume of the seven below-ground categories, and the approximate MAR of each category and the percentage each category makes up of the total MAR of the seven below-ground categories. The first six categories (Pit 9, Trenches A-D, CMPs, Hot Cell Liners, Tritium Packages, and 17th RH Canister) were scheduled to be retrieved and dispositioned in the FY 2015 to FY 2018 period under the schedule submitted under the Framework Agreement. These categories make up 99.84% of the total volume and 99.92% of the total MAR of the seven categories. The 33 shafts make up only 0.14% of the total volume and 0.09% of the total MAR of the seven below-grade categories.

Records of waste generated 30 to 40 years ago are not always complete or consistent, and some differences in container numbers for Trenches A-D and Pit 9 have been identified as records were reviewed in detail. The Hot Cell Liners waste category makes up about 2.1% of the total volume of potential TRU waste required to be retrieved from below ground, but only about 0.0005% of the total activity of TRU waste to be retrieved from below ground.

TABLE 1
Overview of Below-Ground TRU Waste Categories

Category	General Description	Approximate Volume (m³)	Percentage Total Volume	Approximate MAR (PE-Ci)	Percentage Total MAR
Trenches A-D	Approx. 710 30-gal. drums in 4 trenches	335	14.0	93,870	84.8
Pit 9	Approx. 3,882 55-gal., 30-gal. and 85-gal. drums, 191 fiberglass- reinforced plywood boxes, and 6 other containers	1,560	65.0	6,019	5.4
Corrugated Metal Pipes (CMPs) above Pit 29	158 CMP, each ~ 30 in. diameter x 20 ft. long	442	18.4	10,775	9.7
Hot Cell Liners (RH Waste)	5 Shafts with glovebox liners from hot cells, each in a steel box 6 ft. x 6 ft. x 10 ft. long (Shafts 302-306)	51	2.1	0.6	0.0005
Tritium Packages	4 tritium packages, each containing 3 55-gal. drums, and one tritium package with 3 30-gal drums or small tank (Shafts 262- 266)	6.7	0.3	8	0.01
17 th RH Canister	Canister containing 3 55-gal. drums (Shaft 235)	1	0.04	1.5	0.001
33 Shafts (RH Waste)	32 lined shafts with pipes containing 1 or 2 gal. cans of hot- cell debris; 1 shaft with reactor vessel (Shafts 200-232)	3.4	0.14	97	0.09
Total		2,399	100%	110,771	100%

It is important to note that the volumes shown in the table are not the volumes that will be certified and shipped to WIPP. Some containers in the waste unit categories may be determined to be LLW or MLLW that would not be dispositioned at WIPP. Some containers with high MAR such as those in the Trenches A-D waste category are expected to be repackaged and produce a number of daughter drums, while other containers such as the oversize boxes in Pit 9 are expected to result in a much smaller volume that will be shipped to WIPP.

The values shown for MAR are also expected to change as containers are retrieved and processed for disposition. The Environmental Protection Agency (EPA) approved assay methods used for WIPP characterization may produce different values than the historical methods used by the waste generators during the period when the containers in these waste categories were generated.

Figure 3 presents LANL's planned TRU waste disposition timeline for all TRU waste stored at Area G based on the schedule contained in the EM Lifecycle Baseline submittal on June 30, 2014 (Reference 10). This schedule was constrained by specific budget targets for TRU waste disposition and the assumption that LANL will resume shipments to WIPP at the start of FY 2017 (October 2016). This timeline may change as a more certain date for resumption of shipments to WIPP is identified, by changes in budget targets for TRU waste disposition, and other factors such as the priority of LANL shipments to WIPP relative to other DOE sites.

Under this timeline, retrieval of the CMP category of BG waste would begin at the end of FY 2015, and retrieval and processing of CMPs would continue in FY 2016. Shipments of TRU waste from the CMPs category would begin with resumption of shipments of TRU waste from LANL at the start of FY 2017. Retrieval and processing of other BG categories except the 33 Shafts category would begin later in FY 2017. The Hot Cell Liners category is included within the Other Shafts timelines in the figure, with

retrieval and processing beginning near the end of FY 2017 and continuing through FY 2018 and into FY 2019. Shipments of the Pit 9 category of BG TRU waste would be completed in mid FY 2021. This figure assumes that a decision will be made to retrieve and process the 33 Shafts category of TRU waste, and shipping of this category would be completed at the end of FY 2022.

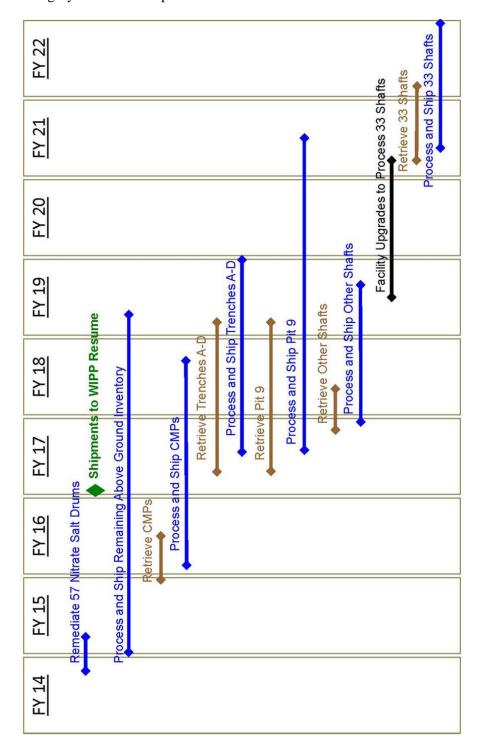


Figure 3. TRU Waste Disposition Timeline under Lifecycle Baseline Submittal of June 2014

3. Origin of Hot Cell Liners Waste

The waste contained within the five metal containers in the five Hot Cell Liners shafts consists of five stainless steel alpha-contaminated hot cell liners removed from Hot Cells 2, 4, 9, 13, and 14 during decommissioning activities in Wing 9 of the CMR Facility (TA-3, Building SM-39). The hot cells had been used for the preparation of irradiated reactor fuel samples for remote metallurgical testing and examination. The hot cell liners waste was generated by the Materials Research and Processing Science (MST-5) Group.

Each of the five hot cell liners was wrapped in either 3- or 4.5-mil-thick plastic and placed into a 6 ft x 6 ft x 6 ft steel box. Blocking was added to limit shifting during transportation and storage. The legs of some of the glovebox hot cell liners may have been removed. The five containers were placed into the Hot Cell Liners shafts on December 5, 1991, based on the disposal log book for shafts that received waste from August 1978 to December 1991 (Reference 11). Pages from the log book related to the hot cell liners are provided in Appendix A to this report.

Figure 4 (from Reference 12) shows a photograph of a typical hot cell liner, which was constructed of stainless steel (top and walls 1/8 inch thick and floor 1/4 inch thick). Dimensions of the hot cell liners or "alpha containment boxes" were 5 1/2 ft square and 11-ft high with the legs. The boxes were painted inside with glossy white radiation-resistant paint before they were installed to aid in illumination, provide contrast, and ease decontamination. Holes were provided in the box walls for glove ports, windows, manipulators, transfer ports, and lighting. The alpha containment boxes were ventilated by a low-flow air system and had provisions for removal of liquid waste. Hot cell liners were installed and removed from the hot cells by removing ceiling blocks over the hot cells.



Figure 4. Typical Hot Cell Liner

All equipment, materials, and waste were removed from the hot cells and the hot cell liners were remotely decontaminated to the extent possible before they were removed from the hot cells. Figure 5 shows a photograph (from Reference 13) of a hot cell liner wrapped in plastic as it was being removed from a hot cell in Wing 9 of the CMR Facility.

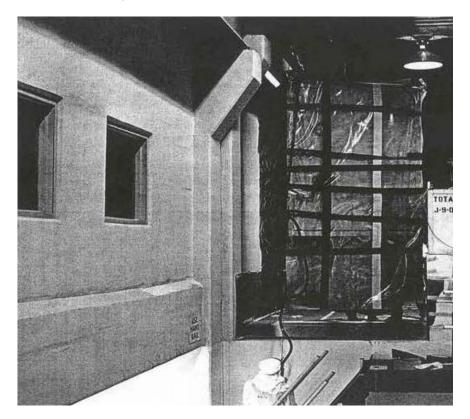


Figure 5. Removing Hot Cell Liner from Hot Cell

4. Configuration of Waste in Hot Cell Liners Shafts

4.1 Shaft Construction and Configuration of Waste Containers in Shafts

The five Hot Cell Liners shafts, designated as Shafts 302 through 306, are located in the south-central portion of Area G as shown in Figure 2 on Page 6. The shafts are oriented northwest-southeast as shown in Figure 6 (from Reference 13) and are located northwest of Trenches A-D (blue rectangles at bottom of figure).

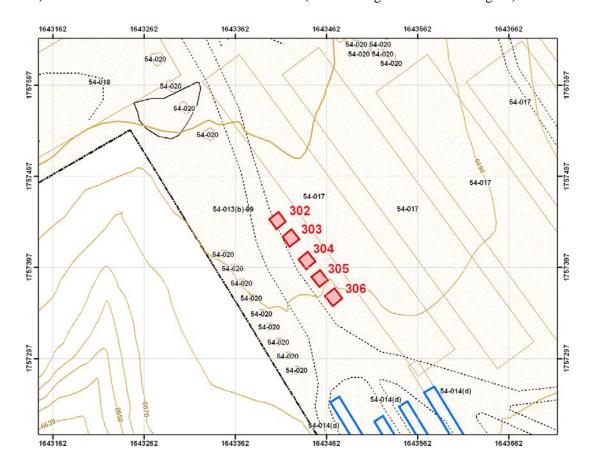


Figure 6. Hot Cell Liners Shafts Location and Orientation

Construction of the Hot Cell Liners Shafts. The shafts were constructed in the latter half of 1991 by boring vertical holes that were approximately ten ft in diameter and 22 ft deep (Reference 14). The bottoms of the shafts were filled with approximately one foot of gravel to facilitate drainage. The shafts were then lined with a 8-ft diameter by 22-ft long CMPs (1/4-inch thick) and the annular space between the vertical holes and the CMPs was filled with crushed tuff. The top of each CMP extended about 1 ft above the ground surface, and a domed concrete collar was placed around the top of each CMP. The shafts were covered with a 1/4 inch steel plate reinforced with angle iron that incorporated lifting lugs and forklift guides for ease of removal.

Configuration of Waste Containers in Shafts. Figure 7 is a sketch of the shaft configuration (which is not to scale), and Figure 8 is a close-up photo of the cover over Shaft 306 and the domed collar around the shaft. Lifting lugs and forklift guides on the cover are clearly visible in the photo. Each shaft contains one steel box that contains one hot cell liner. The steel boxes sit on gravel at the bottom of the shafts, and the tops of the boxes are about 12 ft from the top of the shafts. The boxes have lifting hooks at each corner of the top of the boxes.

Page 11 UNCLASSIFIED Configuration of Shafts

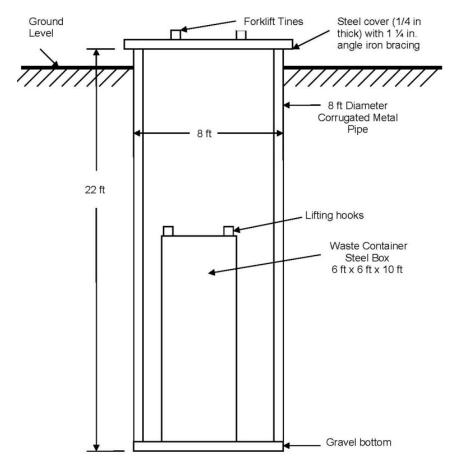


Figure 7. Sketch of Hot Cell Liners Shaft Configuration (Not to Scale)



Figure 8. Shaft Cover and Domed Concrete Collar at Top of Shaft

Figure 9 shows an early photo of Shafts 302-306 as seen from the southwest, with shaft covers extending from the foreground at the right side of the photo and to near the center of the left side of the photo.

Page 12 UNCLASSIFIED Configuration of Shafts



Figure 9. Early Photograph of Hot Cell Liners Shafts 302-306

4.2 <u>Current Configuration of Hot Cell Liners Shafts</u>

While the development of Area G has continued to evolve since 1991, the Hot Cell Liners shafts and the immediate surrounding area have essentially remained unchanged. Figure 10 is a photograph of the Hot Cell Liners Shafts taken in July 2013 looking from the northwest to the southeast.



Figure 10. The Hot Cell Liners Shafts in July 2013

Page 13 UNCLASSIFIED Configuration of Shafts

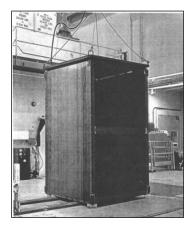
5. Characteristics of Hot Cell Liners Waste

There are a number of sources of information on the characteristics of the waste containers within the five Hot Cell Liners shafts. The most readily accessible information is that contained within the LANL waste database, the Waste Compliance and Tracking System or WCATS. Historic TRU waste database information was electronically transferred to WCATS during 2013. Information contained in WCATS on the Hot Cell Liners waste is based primarily on the information from the Radioactive Solid Waste Disposal (RSWD) Records that were prepared by generators of the waste. For each waste package, the RSWD form recorded waste volume, gross weight, waste radioactive content in either grams or curies, waste matrix, waste generator, and waste disposal location and date. The form required the signature of the waste generator, the HSE-1 (Health Physics Group) area representative, group leader (as necessary), and the Waste Management Group (HSE-7) representative. The original RSWD forms for the five Hot Cell Liners waste containers were located in the Documents section of WCATS. These forms along with corresponding TRU Waste Storage Record (TWSR) forms and Waste Profile Request Form, also retrieved from WCATS as reports, are attached as appendices to this report. Appendix B provides the information for Waste Package S910321 placed in Shaft 302; Appendix C provides the information for Waste Package S910322 placed in Shaft 303; Appendix D provides the information for Waste Package S912719 placed in Shaft 304; Appendix E provides the information for Waste Package S912717 placed in Shaft 305; and Appendix F provides the information for Waste Package S910327 placed in Shaft 306.

Attachments to some RSWD forms include narrative information on operations in the hot cell while the hot cell liner was in place, radiation measurements and calculations used to estimate radioisotopes, and size and weight of the hot cell liners and boxes that contain the hot cell liners.

5.1 Physical Characteristics

Type and Size of Waste Containers. The waste containers are steel boxes approximately 6 ft x 6 ft x 10 ft specially designed and built to hold the decommissioned stainless steel alpha-containment boxes (hot cell liners) for transportation to and storage at TA-54 Area G. The containers are non-standard packages and apparently had no formal design review. A May 1991 memorandum (Reference 15) states that "the metal containers are, at best, strong tight packaging, but have not been tested." The steel boxes have lifting lugs at each corner of the top of the box to facilitate ready emplacement and retrieval. Figure 11 shows photographs of a steel box used to contain one of the hot cell liners. The photo on the left shows the box with the top in place and cables attached to the lifting lugs. The photo on the right shows the box with the top steel panel removed.



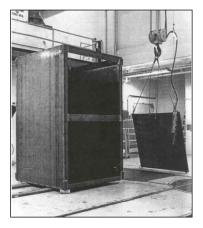


Figure 11. Steel Box used to Contain Hot Cell Liners

Contents of Waste Containers. Each of the five containers contains a single decommissioned stainless steel hot cell liner, similar in configuration to a glovebox. The two hot cell liners placed into the waste containers with Waste Package ID Numbers S910327 and S912717 were described in the narrative attached to the RSWD forms as having dimensions of 65 inches by 65 inches by eight ft tall (Appendices E and F). The others likely have the same or nearly the same dimensions.

Table 2 summarizes the physical characteristics of the five Hot Cell Liners containers. Dimensions and volumes of all of the containers that hold the hot cell liners are exactly the same. Gross weights of the boxes range from approximately 5,400 to 6,200 pounds, and net weights of the hot cell liners waste range from 3,800 to 4,600 pounds. Net weights for waste within each box shown in the waste profile were based on a tare weight for the steel box of 1,600 pounds.

Shaft #	Waste Package or Container ID #	Retrievable Serial Number	Gross Weight (pounds)	Net Weight of Waste (pounds)	Container Dimensions (feet)	Container Volume (m³)
302	S910321	B19844	5,800	4,200	6 x 6 x10	10.2
303	S910322	019960	6,200	4,600	6 x 6 x10	10.2
304	S912719	B19455	5,600	4,000	6 x 6 x10	10.2
305	S912717	B19525	5,400	3,800	6 x 6 x10	10.2
306	S910327	019366	5,400	3,800	6 x 6 x10	10.2
	Totals		28.450	20 400		51.0

TABLE 2
Waste Container Physical Characteristics

Packaging of Waste Containers. Available information indicates the hot cell liners/gloveboxes may have been consolidated by cutting their legs off for packaging into the steel boxes. While no information exists on the status of the legs, it is assumed they were placed inside the liners/boxes. The liners/boxes were wrapped in plastic sheeting before being placed into the steel container. The RSWD forms for the waste packages indicate that three of the hot cell liners were wrapped with one layer of either 3-mil or 4.5 mil plastic, and two of the hot cell liners were wrapped in two layers of 3-mil plastic. Blocking was added to diminish shifting during transport and storage, but no information was located on composition of the blocking material. Figure 12 shows a photograph of a wrapped hot cell liner being placed into a steel box container. Presence of a worker in the photograph provides good perspective on the size of the hot cell liners and the box containers that hold them.



Figure 12. Placement of Hot Cell Liner inside Steel Box Container

5.2 Radiological Characteristics

Available Information on Radiological Content of Containers and External Radiation Dose of Containers. The WCATS database provides radionuclide content for each of the five hot cell liners containers based on the RSWD and Waste Profile Request forms provided by the waste generator in 1991. The RSWD forms for the hot cell liners list amounts of nuclear Material Types U38 (approximately 93% uranium-235 or U-235) and PU55 (approximately 84% Pu-239) and estimates of a number of mixed fission products (MFP) isotopes. The WCATS database calculates quantities of a large number of specific isotopes, as well as PE-Ci and Pu-239 fissile gram equivalents (Pu-239 FGE).

Primary radionuclides listed in the WCATS database for the hot cell liners containers consist of Pu-239, Pu-241, U234, and U-235. Other radionuclides listed include americium-241 (Am-241), antimony-125 (Sb-125), barium-137 (Ba-127), cesium-137 (Cs-137), europium-155 (Eu-155), Pu-238, Pu-240, Pu-242, promethium-147 (Pm-147), rhodium-106 (Rh-106), ruthenium-106 (Ru-106), strontium-90 (Sr-90), tellurium-125 (Te-125),U-236, U-238, and yttrium-90 (Y-90).

Three of the RSWD forms for the hot cell liners include a narrative that explains the dose measurements and calculations used in the analysis to estimate quantities of plutonium, uranium, and MFP isotopes reported on the RSWD forms. The MFP isotopes other than Cs-137 were based on a dose measurement that was believed to be primarily due to Cs-137. Table 3 provides a summary of the radiological characteristics of the five Hot Cell Liners waste containers based on information provided by the waste generator in 1991. The hot cell liners were decontaminated remotely "as well as possible" before they were removed and the PE-Ci and Pu-239 quantities are relatively low. Radiation dose measured at the surface of the containers, primarily due to contamination by MFP, was relatively high at the time that the hot cell liners were removed but declined rapidly with distance from the container as seen in the column for radiation dose at one meter. The radiation dose resulting from MFP contamination should be considerably lower today because of the relatively short half-life of the primary MFP isotopes. Totals for PE-Ci and Pu-239 in the table are somewhat higher than the sum of the individual container quantities due to rounding of the values for each container.

TABLE 3
Hot Cell Liners Radiological Characteristics

Shaft Number	Waste Package Number	Retrievable Serial Number	Number of Containers	PE-Ci	Pu-239 FGE	TRU Alpha Concentration (nCi/g)	Radiation at Contact with Surface (mR/hr)	Radiation at 1 meter (mR/hr)
302	S910321	B19844	1	0.05	1.1	23.3	200	32
303	S910322	019960	1	0.15	3.3	53.2	700	120
304	S912719	B19455	1	0.10	2.3	51.4	600	70
305	S912717	B19525	1	0.22	4.9	110.3	800	90
306	S910327	019366	1	0.11	2.5	57.3	650	50
	TOTALS	5	5	0.64	14.2			

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A 2005 review of data for the hot cell liners (Reference 16) includes calculations for decay of the radioisotopes reported in the WCATS database for each hot cell liner to the year 2009. These calculations were based on use of an Oak Ridge National Laboratory computer code. Dose rates at contact of the container were also calculated as decayed to 2009. The calculated decayed dose rates were about 35% lower than the initial measured dose rates for three of the hot cell liners containers, but were considerably higher than the initial measured dose rates for two of the containers. This result was not explained in the narrative of the report.

A 2006 inspection and field study of Shafts 302-306 measured surface radiation dose on the top and each side of each of the hot cell liner boxes at several depths from the top of the shafts. These measurements all indicated doses \leq 200 mrem/hour (Reference 13).

Transuranic or TRU waste is defined in the WIPP Waste Acceptance Criteria (Reference 17) as waste contaminated with alpha-emitting transuranic radionuclides (those with atomic number greater than 92) that have half-lives greater than 20 years at concentrations equal to or greater than 100 nanocuries per gram (nCi/g). The weight of the waste for this determination is the weight of the material placed into the payload container (i.e., the net weight of the container) (Reference 17). Calculations on the concentration of alpha-emitting TRU isotopes with half-lives greater than 20 years for the hot cell liners containers are included in Table 3 using container net weights and radiological data in the WCATS TWSR reports for Am-241, Pu-238, Pu-239, and Pu-240 (which were based on radiological content of the containers provided by the waste generator). These calculations show that four of the five containers do not meet this definition and should be considered LLW while the fifth one does and would be considered TRU waste if the steel box is considered to be the payload container. However, the steel boxes are not WIPP-approved containers and are not qualified as Type A containers. They will need to be overpacked into a qualified Type A container for transport. Therefore, gross weight of the current containers hot cell liners and steel boxes) should be considered in the concentration of alpha-emitting TRU isotopes and all five containers would be calculated to have less than TRU levels of contamination under this approach.

Radioassays were performed on each of the five hot cell liners containers stored in Shafts 302-306 during March 2014 to determine/verify/validate whether the containers should be considered LLW or TRU waste per the above definition. The results of these radioassays are shown in Table 4. The Radioassay Data Sheets for the containers are also attached as Appendix G to this report. Weights used in the calculations in the Radioassay Data Sheets include the weights of the steel boxes that hold the hot cell liners as discussed above.

TABLE 4
March 2014 Radioassay Results

Shaft	Waste	TRU	
Shart #	Package or	Alpha	
#	Container ID #	(nCi/g)	
302	S910321	14.1	
303	S910322	39.6	
304	S912719	29.7	
305	S912717	92.9	
306	S910327	33.4	

The results of the calculations for each radioassay show that all five containers assayed less than the limit for TRU waste (which is ≥ 100 nCi/g of alpha-emitting transuranic radionuclides with half-lives of 20 years or greater), and thus should be reclassified to be LLW rather than TRU waste.

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5.3 Chemical Characteristics

The 1991 Waste Profile Request Form for the hot cell liners waste stream that was attached to the RSWD forms included a certification by the waste generator that the hot cell liners contained no hazardous constituents. The form shows that the waste contains none of a list of 10 specific heavy metals (including arsenic, barium, chromium, lead, mercury, nickel, and selenium) and 21 specific organic compounds (including benzene, carbon tetrachloride, chlorobenzene, chloroform, methyl ethyl ketone, and nitrobenzene), and that there are no other hazardous constituents in the waste. The evaluation was based on knowledge of process. The Waste Profile Request form was also reviewed and the Waste Classification determined to be TRU waste (not hazardous or mixed waste) by a hazardous waste specialist from the LANL Environmental Protection Group (HSE-8).

Waste removed from the hot cells during decommissioning was also identified as non-hazardous by the waste generator, but was assigned a number of EPA Hazardous Waste Numbers (HWNs) during the Acceptable Knowledge (AK) review by the Central Characterization Project (Reference 18). This waste stream was identified as Waste Stream LA-MHD03.002, and was packaged into 16 RH canisters that were shipped to WIPP in 2009. To assign EPA HWNs, AK sources including CMR procedures, personnel interviews, reports, container packaging and shipping documentation, and material safety data sheets for commercial products noted in the AK record were reviewed. A detailed listing of material and chemical inputs was developed and specific EPA HWNs were identified for many specific chemicals and materials. These EPA HWNs were "conservatively assigned for compounds used in the hot cells due to the lack of analytical evidence quantifying the concentration of RCRA toxic constituents in the waste matrix or the identification of the use of listed solvents in the hot cell area" (Reference 18). The detailed listing of material and chemical inputs indicates that paint strippers/removers/ thinners were used for decontamination of alpha containment boxes at some point during operation of the hot cells, but that Fantastic cleaner was used for hot cell cleaning and decontamination of the alpha containment boxes during D&D. Common ingredients of paint strippers/removers/ thinners include acetone, butanol, benzene, methylene chloride, toluene, methanol, methyl ethyl ketone, and isopropanol (Reference 18).

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6. Retrieval and Processing Hot Cell Liners Waste

As discussed above, the recent assay of the containers that hold the hot cell liners provided results that all five of the containers are contaminated with levels of TRU isotopes below 100 nCi/g. Under the WIPP Waste Acceptance Criteria (WAC) (Reference 17), these containers would not be eligible for disposition at WIPP if contamination is less than 100 nCi/g of alpha-emitting TRU isotopes with half lives greater than 20 years. The containers should be reclassified to LLW (if confirmed as non-hazardous) or MLLW. If determined to be non-hazardous, this raises the question of whether or not the containers that hold the hot cell liners require retrieval from Shafts 302-306. Options to disposition the containers in Shafts 302-306 without retrieval and retrieving the containers from the shafts with disposition off the LANL site are discussed below.

6.1 <u>Disposition of Hot Cell Liners Without Retrieval</u>

One of the commitments in the January 2012 Framework Agreement between DOE/NNSA and the NMED (Reference 2) states: "Based on projected funding profiles, DOE/NNSA will develop by December 31, 2012, a schedule, including pacing milestones, for disposition of the below-ground TRU requiring retrieval at Area G."

The Schedule for Disposition of Below-Ground Transuranic Requiring Retrieval (Reference 3) that was submitted to the NMED on December 10, 2012, under the Framework Agreement states in part:

- "DOE/NNSA has determined that there are seven below-ground waste unit categories within Area G that potentially contain TRU waste *that may require retrieval* (emphasis added)."
- "..., but some of this waste volume may later be determined to be low-level waste (LLW) that would not require retrieval."
- "The schedule and pacing milestones assume that the waste volumes determined to be LLW will not be removed, but will be considered to be dispositioned for the purpose of the schedule and pacing milestones above."

Based on these provisions, it does not appear that the Framework Agreement and schedule submitted under the Framework Agreement would require retrieval if the hot cell liners containers are reclassified as LLW. However, there are other issues that must be addressed for a determination that the hot cell liners containers should not be retrieved and can remain in Shafts 302-306. These issues include whether there is sufficient information for a definitive determination that the containers do not contain hazardous waste, whether the containers meet the LANL Waste Acceptance Criteria (WAC) for LLW, and whether DOE/NNSA would approve leaving the containers in place. Shafts 302-306 are not currently authorized for LLW disposal because the DOE-approved Performance Assessment/Composite Analysis does not include the waste in these shafts since it was identified as retrievably-stored TRU waste (Reference 19).

As discussed above, the Waste Profile Form for the hot cell liners waste stream included a certification by the waste generator in 1991 that there were no hazardous constituents in the waste and the waste classification was determined to be TRU waste and not hazardous or mixed waste. This determination that the waste contains no hazardous constituents was based on knowledge of process rather than sampling and analysis, and needs to be confirmed as sufficient if the containers are to be disposed at Area G because LANL is not permitted to dispose of hazardous or mixed waste at Area G. Also as discussed above, the waste generated during decommissioning of the hot cells was conservatively assigned a number of EPA HWNs by the CCP based on identification of materials and chemicals used in and around the hot cells.

Based on the available information, it appears likely that the containers that hold the hot cell waste do not meet the Section 3.1.1 requirement in the LANL WAC for LLW (Reference 20) that the "void space within the waste or the waste package must not exceed 10%." It appears that the hot cell liners are empty and the void space in the container would be considerably greater than 10%. It may be possible to meet this requirement by filling the

void space within the hot cells with cement grout, or obtain an exception to this requirement by grouting of the containers in the shafts or use of some other treatment to minimize future subsidence of the area above the shafts.

Disposal of the hot cell liners containers in Shafts 302-306 is also currently excluded from the Area G LLW Performance Assessment/Composite Analysis inventory because the containers were expected to be retrieved. A Supplement Analysis and approval by DOE/NNSA would be required to address this issue. Finally, there may be other state or federal requirements to fulfill before a decision to leave the hot cell liners in Shafts 302-306 could be final.

6.2 Retrieval of Hot Cell Liners and Disposition Off the LANL Site

The other option is to retrieve the containers that hold the hot cell liners from Shafts 302-306 and disposition the containers at an approved location off the LANL site, either as LLW or MLLW. The option of disposing of the containers as LLW at another site at LANL (other than Shafts 302-306) was not considered because LANL is scheduled to exhaust all other currently available LLW disposal capacity during FY 2014.

Retrieval of the five containers from Shafts 302-306, although involving a critical lift, should be straight-forward and consist primarily of removing the steel cover from the shafts, lifting the steel containers that hold the hot cell liners from the shafts using the lifting hooks on the boxes with a crane, and placing the hot cell liners boxes in a staging area. The containers would then be moved to above-ground storage and processing for disposition. There is some concern for tritium exposure during removal because there is a tritium plume in the soil in the vicinity of Shafts 302-306 (Reference 13).

A 2006 inspection of the containers stored in Shafts 302-306 (Reference 13) showed:

- There was no standing water in the bottom of the shafts;
- The hot cell liners containers (boxes) were in good condition
- Welded seams had no visible rust and were intact;
- Lifting hooks on the boxes were in good condition with no visible signs of deterioration; and
- Smears of the box surfaces showed radiation contamination was within limits for free release.

Air and swipe sampling conducted during the 2006 inspection (Reference 13) showed that:

- Tritium air concentrations exceeded the recommended action level of 20 microcuries per cubic meter (μCi/m³) three of the seven days in the field with measured values between 7 150 μCi/m³. However, the authors concluded that the tritium air concentrations detected by the tritium air monitoring instruments were likely reported higher than the true tritium concentration in the air because weather conditions may have caused radon emissions from the soil to be measured as tritium by the instruments that were used;
 - Air sampling results indicated concentrations for the lower explosive limit, volatile organic compounds (VOCs), carbon monoxide, and hydrogen sulfide concentrations were all below action levels. SUMMA[®] canister results further confirmed VOCs were below action levels. The report concluded that there was no explosive hazard or any concern for exposure to VOCs, carbon monoxide, or hydrogen sulfide;
 - Oxygen levels were normal;
 - Airborne levels of radionuclides were less than the Derived Air Concentration limits, and therefore respiratory protection would not be needed to conduct retrieval operations at Shafts 302-306;
 - There was no removable radiological contamination on the hot cell liners;
 - There was no detected tritium activity in any of the smears collected from the hot cell liners; and.
 - Dose rates on the exterior surface of the steel boxes were less than WIPP acceptance criteria for contact handled waste (≤ 200 mrem/hour).

It has been approximately eight years since this inspection and sampling of the hot cell liner shafts, and a similar inspection and sampling campaign is highly recommended before retrieval is initiated. However, there is no reason to believe that the containers are not in good condition or that there will be major issues in retrieval based on the configuration of the shafts and the previous inspection and field study. Readiness activities may also be required.

There are two general options for final disposition of the hot cell liners containers off-site:

- Off-site disposal as LLW at one of three LLW disposal sites in Utah, Texas, or Nevada provided the
 waste can be verified to meet the offsite facility's WAC, and there is a final determination that the waste
 contains no hazardous constituents. As discussed above, the 1991 LANL Waste Profile Form included a
 certification by the waste generator that there were no hazardous constituents, based on knowledge of
 process.
- 2. Offsite treatment for MLLW, if hazardous waste constituents exist or if there is a decision to conservatively assume that hazardous constituents may exist, followed by disposal. Once again, this assumes that the waste can be verified to meet the offsite facility's WAC.

Regardless which of the above options is chosen, the general process for disposition will include:

- 1. Characterization of the waste in accordance with the receiving facility's WAC. Characterization will define radiological constituents, radiation dose at the exterior surfaces of the boxes, hazardous waste constituents, and prohibited items (e.g., liquids, explosives, void spaces, etc.) Because Container S912717 is so close to the TRU waste concentration limit, it is recommended that this container be reassayed after removal from Shaft 305 to confirm that the concentration of alpha-emitting TRU isotopes with half-lives greater than 20 years is less than 100 nCi/g.
- 2. Consideration should be given to decontamination and surface-contaminated object characterization of the hot cell liner in Container S912717 to provide greater confidence that TRU alpha contamination is below the TRU waste limit. If the surface dose rates for any of the five boxes exceed 200 mrem/hour, it may be desirable to decontaminate the glove box liner so that the container can be managed as contacthandled waste.
- 3. Radiography or visual verification that there are no prohibited items within the hot cell liners.
- 4. Remediation (filling void space or size reduction to reduce void space, or addressing other issues) if required to meet the receiving facility's WAC.
- 5. Documentation of the characterization information on the receiving facility's Waste Profile Form (WPF) and submittal of the form for review and approval. If the waste is MLLW it may be necessary for the waste to be treated at one facility, and transported to another facility for final disposition. In this case, the goal would be to contract with the treatment facility to handle the whole process: treatment, transport to disposal facility, and disposal.
- 6. Obtaining approval of the WPF from the receiving facility.
- 7. Performing an independent verification of the waste characterization.
- 8. Packaging the waste for transportation and disposal.
- 9. Preparation of a disposal request with transportation information for the receiving facility's review and approval.
- 10. Obtaining approval of the disposal request.
- 11. Shipping the waste for disposal.

Considerations in accomplishing the above process include:

- 1. Contracts for as needed treatment, as needed transportation, and disposal.
- 2. DOE approval to treat, store, and dispose at a non-DOE site. This is referred to as a DOE Order 435.1 exemption to the requirement that LLW generated at DOE facilities be preferentially treated, stored, and disposed at the site where the waste is generated (if practical), or at another DOE facility. The DOE *Radioactive Waste Management Manual* (Reference 8) allows for an exemption from this requirement

provided the use of a commercial facility for disposition of a specific waste stream is in the best interest of DOE. In order to ship LLW or MLLW to one of the commercial facilities, an exemption request for a waste stream would need to be approved by the Los Alamos Field Office with notification to DOE Headquarters, Office of the Assistant Secretary for Environment, Safety and Health.

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- 19. R. Shuman, *Radioactive Waste Inventory for Los Alamos National Laboratory Technical Area 54*, *Area G*, LA-UR-08-06107, August 2008.
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Appendix A

Disposal Log Book Pages Related to Hot Cell Liners

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56	Т.	R.L	1.	HOT		C	ELL	STO	RAGE	57
DATE RECEIVED 12 - 05-91 SHAPT NO.		GROUP MST-5		TA-3	WASTE TYPE	Number or PACKAGE S 5-5 ALPHA BX.	Volume 360,0F	Amount	Accomulated Fissle Amount	A. CATANACI
12-05-91 SHAFT NO. 302	910321 Box NO. 19844	MST-5	co538	TA-3		STAINLESS STEEL BOX	360.0F.	#1		A-CATAMACIL
12:05-91 SHAFT NO. 303	910322	ust-5	cos38	TA-3	HOT CECC	STAINLESS STEEL BOX	360,0F			A. Caranació
	Вох NO. 19960								-	
12-05-91 544FT NO. 305	91 2717 BOX NO. 19525	มธา-5	CO538	TA-3	HOT CECL WASTE	STAINLESS STEEL BOX	360,0F			A-CATANACU
12-05-91 DHAFT NO. 306	910327	JUST-5	00538	TA-3	HOT CELL WASTE.	STAINLESS STEEL BOX	360.0F			A. Cotanaci.
					CO-STC .	· ·				M. WIANACH.



Appendix B

TRU Waste Storage Information, Container S910321 Stored in Shaft 302 This page intentionally left blank.





S910321

1. Generator's Pre-l	Jse Visual	Inspection
----------------------	------------	------------

Purchase Order #					Inspected Items							
	been visually inspected a be free of damage that wo					R	Ring, Bolt,	and Nut	Chi	me		ents
packaging.	e nee or damage mat wo	Julu IIIake	าแ นกรนแสมเ	e ioi i	NO waste		id and Ga	sket	☐ Go	uges		aint
Printed Name				Signa	ture			Sig. Dat	e	(Oper. Da	te
2. Generator's P	ackage Information											
Group	Technical Area	Buildi	ng		Cost Center		Prograi	m Code	Cost A	ccoun	t Woi	k Package
LTP-PTS	54		000000									
Additional Infor	mation				□ DP □	Non	-DP If	Non-DP	waste, at	tach D	OE app	roval doc.
							Ra	adionuc	lide Cont	ent		
								44.01.40				C= Curie
					Nuclide			ount		certaiı	-	M = Gram
Container		Liner			Am-241	_	1.0821			000E-		С
Steel Drum (55 gal.)	✓ Nor	ne		Cs-137		2.7001			000E-		С
Pipe Overpa	ck Type:	90 r	mil liner		Pu-238		3.5991			000E-		С
Steel Drum (85 gal Overpack)	<u> </u>	mil liner		Pu-239	_	1.822		0.	000E-	+000	С
☐ Standard Wa	ste Box	☐ Fibe	erboard Li	ner	Pu-240		1.171	E-002	0.	000E	+000	С
☐ Standard Wa	ste Box Overpack	Interna	l Shieldin	ng	Pu-241		3.7291	E-001	0.	000E	+000	С
RH Canister		✓ Nor	ne		Pu-242		4.194E-006 0.0		0.000E+000		С	
Other (Call T	WCO)	Type	Thickne	ess	Ru-106		1.979	E-003	0.	000E	+000	С
Filter Serial No.	01						Н	azardoı	us Materi	als		
Filter Serial No.	02						Name			EP	A Code	Qty (g)
Waste Profile Nu	ımber 5339	3 (WS	ID 370	17)								
Gross Weight (lb	o.)	,	5.80E+0	003								
Net Weight (lb.)	,		4.20E+0									
Shipping Catego	ry											
LANL Waste Stre	•		TA-03-	-27								
TRUCON Code												
_												
Date Closed (MN	M/DD/YY):				Accumulation Start Date (MM/DD/YY): 12/04/91							
	ction were collected, an	d waste	described h		was packaged							
Printed Name					Signature					Date	:	
Generator Site	Health Physics Inf	ormatio	n									
	•		<u>, , , , , , , , , , , , , , , , , , , </u>		Survey Date	Sur	vey Meter	· Model	Property N	umber	Calibra	tion Void Date
Gamma Dose Ra	ate (mrem/h) (contac	t)			Ourse Date			. N.A d. d	Danie anti- N		0 - 111	Cara Matal Data
Neutron Dose Rate (mrem/h) (contact)			Survey Date	Sur	vey Meter	iviodei	Property N	umber	Calibra	tion Void Date		
Total Dose Rate	(mrem/h) (contact)					•					•	
Total Dose Rate (mrem/h) (1 meter)				The data in this section were collected according to approved procedures.						ocedures.		
Alpha Contamina	ation (dpm/100cm2)				Printed Name)					Date	
Beta-Gamma Co	ont (dpm/100 cm2)				Signature							



Printed Name



Date:

4. TRU Waste Management Review/Authorization

The data package for this waste has been reviewed. Basedon the information provided, this waste meets the WAC requirements for storage at TA-54.				Printed Name Date:							
				Signature							
5. Preload Visual Ir	spection			-							
according to approved labeling requirements	This waste package was visually inspected prior to transport according to approved procedures. It meets WAC packaging and labeling requirements and is free from obvious damage and				Printed Name Date:						
defects. 6. Receiving Site H	ealth Physics Inf	ormation									
Gamma Dose Rate (mrem/h) (contact)					Date	Survey Meter Mo	del Pr	operty Numbe	r Calibration Void Date		
Neutron Dose Rate				Survey D	Date	Survey Meter Mo	del Pr	operty Numbe	r Calibration Void Date		
		,,,									
Total Dose Rate (m				-							
Total Dose Rate (m	rem/h) (1 meter)			Printed N		is section were col	ected a	according to ap	proved procedures. Date		
Alpha Contamination	on (dpm/100cm2)			Signatur							
Beta-Gamma Cont	(dpm/100 cm2)			Signatur							
7. Storage Site Info	rmation	T									
Received by (Initials)		Date Receiv	/ed	Original Storage Data							
This waste package wand in good condition.						ding Number umn Number	Layer		Row Number		
procedures. Printed Name			Date:						Date:		
			Date.								
Signature					Sigr	nature					
8. Waste Acceptan	ce Office										
Intials/Date				V	/E D	escription					
NCR Number	Intials/Date					NCR Descri	otion				





9. Continuation Sheet for Radionuclide Content (from Page 1, Section 2)

			C= Curie
Nuclide	Amount	Uncertainty	M = Gram
Sr-90	2.468E-001	0.000E+000	С
U-234	9.022E-005	0.000E+000	С
U-235	2.817E-006	0.000E+000	С
U-236	3.715E-007	0.000E+000	С
U-238	2.604E-008	0.000E+000	С
Y-90	2.468E-001	0.000E+000	С

10. Continuation Sheet for Hazardous Materials (from Page 1, Section 2)

Hazardous Materials					
Name	EPA Code	Qty (g)			
No Additional Hazardous Materials		·			



S910321 T-TTRU-TEMP

Status:

WS ID: 37017 C ID: 791773 Opt ID: B19844 ACTIVE

ACTIVE

SC: Shield cask

04-Dec-1991

Remotely handled canister

04-Dec-1991 12:00 am

NO

GENERAL INFORMATION

Decommissioned:

Container Subtype:

Accum Start Date:

Container Type:

Origin Date:

Closed Date:

 Container ID:
 791773

 Labeled ID:
 S910321

Optional ID: B19844

Chemical Barcode:

Physical State: SOLID
Waste Stream ID: 37017

Work Path: T-TTRU-TEMP

Quantity (Univ):

Compactible:

Discard Matrix:

TID(s):

Gen Contact:

Insert By:

Waste Desc:

sert By: WCATS APPLICATION (000000)

GENERATED AT 03-00029

WEIGHTS AND VOLUMES

Container Volume: 10.20 CM Gross Weight: 5800.91 lb

Waste Volume: NOT SPECIFIED Tare Weight: 1600.00 lb

Net Weight: 4200.91 lb

LOCATION

Pickup (Origin): LANL: 03-CMR: GEN-AREAS

Current: LANL: 54-G-DISP: SHAFT302



CONTAINER PROFILE S910321 T-TTRU-TEMP

WS ID: 37017 C ID: 791773 Opt ID: B19844 ACTIVE

PAYLOAD INFORMATION

Container Procurement

P.O. Number: Year of Manuf:

Lot No.: Serial No:

Solution Package: 53: SP BG - Hot Cell Liners

TRUCON Code:

Shipping Category:

CCP AK Report:

WIPP Waste Stream: TA-03-27: COMBINED COMBUSTIBLE AND NONCOMBUSTIBLE

Matrix Code:

Defense Waste: Equiv. Comb. Matrix:

Adeq. Ventilation: Compliant Metal Cont.: YES

Overpack (1 to 1): NO Retrievable: BIR WS Code: LA-RM14

Content Code:

				COS	ST CODES		
Cost Center	Prog Code	Cost Account	Work Package	Percent Allocation	Cost Center Status	Cost Code Status	Recharge Mode
	X77A			100.00			SELECTION LIST

		EPA CODES
System	Hazardous	
Code	Waste No.	Waste Description & Treatment Subcategory



CONTAINER PROFILE \$910321 T-TTRU-TEMP

WS ID: 37017 C ID: 791773 Opt ID: B19844 ACTIVE

	RADIONUCLIDES								
Nuclide	Amount	Unit	Uncert	MT Derived (Y/N)	Activated (Y/N) MDA Result (Y/N)	Form (Y/N)	Measurement Code/Comment		
Status: Activ	ve, Assay Page:	377206,	Date: 12/04/199	1, Deri	vation: Generator	r Ente	red Results (e.g., Offsite Assay)		
38	1.40E+000	g	0.00E+000	N			NONE		
55	3.50E-001	g	0.00E+000	N			NONE		
Am-241	1.08E-002	Ci	0.00E+000	Y		Y			
Cs-137	2.70E-001	Ci	0.00E+000	N		Y			
Pu-238	3.60E-003	Ci	0.00E+000	Y		Y			
Pu-239	1.82E-002	Ci	0.00E+000	Y		Y			
Pu-240	1.17E-002	Ci	0.00E+000	Y		Y			
Pu-241	3.73E-001	Ci	0.00E+000	Y		Y			
Pu-242	4.19E-006	Ci	0.00E+000	Y		Y			
Ru-106	1.98E-003	Ci	0.00E+000	N		Y			
Sr-90	2.47E-001	Ci	0.00E+000	N		Y			
U-234	9.02E-005	Ci	0.00E+000	Y		Y			
U-235	2.82E-006	Ci	0.00E+000	Y		Y			
U-236	3.71E-007	Ci	0.00E+000	Y		Y			
U-238	2.60E-008	Ci	0.00E+000	Y		Y			
Y-90	2.47E-001	Ci	0.00E+000	N		Y			



S910321 T-TTRU-TEMP

WS ID: 37017 C ID: 791773 Opt ID: B19844 ACTIVE

RAD CALCULATIONS

Total Activity (nCi/g): 6.20768E+02 DOTFissile Mat (g): 1.60006E+00 Alpha (nCi/g): 2.33281E+01 **Transport Index:** TRU Alpha (nCi/g): 2.32743E+01 **NRC Class:** С Pu-239 FGE: **DOT Type:** 1.14069E+00 В Pu-239 FGE [2U]: 1.14069E+00 **LSA-I Fraction:** 5.03699E+01 Pu-239 Eq-Ci: 5.21946E-02 LSA-II Fraction: 1.02298E-02 Y 5.11492E-04 Pu-239 Eq-Ci [2U]: 5.21946E-02 **LSA-III Fraction:** Υ TRU Pu-239 Eq-Ci: Reportable Quantity: 5.15191E-02 7.57337E+00 * ALC Ratio: TRU Pu-239 Eq-Ci [2U]: 5.15191E-02 2.69640E+06 NE * ACM Ratio: Decay Heat [U] (W): 3.39680E-03 1.51110E+03 NE Tritium (Ci/m3): 0.00000E+00 **Limited Quantity:** 1.94930E+03

Weight/Volume Used:

TRU ECW PE-Ci:

1 Container Net Weight: 1.90550E+03 kg *ALC (Activity Limit for Exempt Consignment)
2 Container Volume: *ACM (Activity Concentration for Exempt Material)

5.15191E-02

U = 1 Uncertainty, 2U = 2 Uncertainty

		TASK HISTORY	
Date/ Time	Task ID/ Status	Task Name/ Storage or Disposal Grid Location	Reject
12/05/1991 12:00 AM	1784365 EXECUTED	LANL:03-CMR » 54-G-DISP:SHAFT302	NO

Note: Highlighted row indicates container was output or receiving container for the indicated task

	DOCUMENTAT	ION
Doc. Number	Title	Uploaded By
1	S910321-TWSR	WCATS APPLICATION (000000)

	COMMENTS
Date Time/ User Name	Comment
08/23/2013 9:37 AM WCATS APPLICATION (000000)	CELL4 STEEL ALPHA BOX IN STEEL BOX PUT RH SHAFT WPRF# 00538

		EDIT LOG
Date Time/ User Name	Quality Record	Explanation
02/12/2014 7:52 AM ROBERT W JONES (117434)	NO	Edit Admin Form Authorization; Looking for [P=108734, A=class gov.lanl.wcats.view.profile.container. dialog.JCVerification]; Error: Permission Not Found; Reason for Edit: Open Dialog
02/12/2014 7:52 AM ROBERT W JONES (117434)	NO	Edit Admin Form Authorization; Looking for [P=108734, A=class gov.lanl.wcats.view.profile.container. dialog.JCSTPEditor]; Error: Permission Not Found; Reason for Edit: Open Dialog



CONTAINER PROFILE \$910321 T-TTRU-TEMP

WS ID: 37017 C ID: 791773 Opt ID: B19844 ACTIVE

		EDIT LOG
Date Time/ User Name	Quality Record	Explanation
08/23/2013 9:45 PM WCATS APPLICATION (000000)	NO	TRUP.TRUPKG TABLE (WASTEDB): [PKG_ID] = S910321, [ALPHA_CONT] = , [APPROVE_BY] = , [APPROVE_DATE] = , [BETA_GAMMA_CONT] = , [BLDG_CD] = 03-00029, [BX_SERIAL] = , [CERT_STATUS] = , [COLOR_CD] = , [COMMENTS] = CELL4 STEEL ALPHA BOX IN STEEL BOX PUT RH SHAFT WPRF# 00538, [CONTENT_CODE] = , [CONTROL] = , [DATE_CLOSED] = , [GAMMA_DOSE] = , [GROSS_WT] = 5800.914, [GRP] = MST5, [NEUTRON_DOSE] = , [NORMAL] = , [OLDDRUMNUM] = B19844, [OLDVOL_UNIT] = F, [OLDWT_UNIT] = T, [ORG_VOL] = , [ORG_WT] = , [PKG_CD] = 04, [PKG_CD_DESC] = REMOTELY HANDLED CANISTER, [PKG_DATE] = 1991-12-05 00:00:00, [PKG_FISS_GRAMS] = 1.1367161199010273731322969176470618967, [PKG_LOT] = , [PKG_PE_ACT] = .051577823851910515509477989547866731588, [PKG_TARE_WT] = 1600, [PKG_VOLUME] = 10.195, [PROC_BTCH_CD] = , [PROG_CODE] = X77A, [ROOM] = X77A, [SAMPLE_ID] = , [THERMAL] = .003378350829141454700592540517388048374, [TOTAL_DOSE] = 200, [TOT_ANCG] = 23.3764620886144690370350151372408274914, [TRUCON_CD] = , [WASTE_CD] = 52, [WPRF_CD] = , [YR_MFG] = , [WASTE_TYPE] = , [INSP_DATE] = , [AUA_VUA] = , [PROCESS_ID] = , [WGEN_CD] = , [DOT_TYPE] = , [BIR_ID] = LATR05, [RQ] = , [LSA_SCO_CD] = , [LSA] = , [A_START_DATE] = , [BIR_WS] = LA-RM14, [LA_WS] = TA-03-27, [SWBOP] = , [RETRIEVABLE] = , [OFFSITE] = , [LINER_CD] = , [INST_WT] = 4200.914, [SHIP_CD] = , [WASTE_STREAM] = , [OVERPACK] = N, [REPACKED] = , [INVENTORY_NO] = , [INVENTORY_DT] = , [VASTE_COMPLETE] = , [CHCD_CA_CD] = , [CHCD_WP_CD] = , [DOT_DP] = , [WASTE_VERIF] = , [VERIF_COMPLETE] = , [HDL_CD] = , [UPD_WHEN] = 2004-07-02 12:08:37, [UPD_WHO] = 114644, [PHY_STATE] = S, [PKG_H3_ACT] = 0, [QTW] = N, [AK_REPORT] = , [STP] = 0
08/23/2013 12:33 PM WCATS APPLICATION (000000)	NO	TRUP.UPD_HISTORY TABLE: [UPD_ID]= 12682, [AUTH_BY]= 113199 -> CHRISTENSEN DAVIS V , [AUTH_NUM]= SR318, [PKG_ID]= S910321, [UPD_WHEN]= 03-26-1996, [UPD_WHO]= Z111142 -> LONGLEY JOHN M , [WHAT]= tgrams, tcuries, fiss_grams, thermal, pkg_pe_act,pkg_fiss_grams, [WHY]= Correct errors
08/23/2013 8:50 AM WCATS APPLICATION (000000)	NO	INITWORKPATH (C_ID=791773/PATH_ID=465): SKIPPED (NO WORKPATH UNITS)

Los Alamos

Los Alamos National Laboratory

RH-TRU. RADIOACTIVE SOLID WASTE DISPOSAL RECORD

NOTE: Read instructions on back carefully before completing this form.

LOS Alamos, INEW ME 1. Form Number		,	on back carorally belove con-	HSE-7 Waste Manag	-
s 9 1 Q32 [Ext. 6095, MS J5	92
2. Date	3. Retrievable	4. Origin of Waste		5. W	
MMDDYY	Serial Number	Group	TA Building	Wing Program Code Co	ode
082391	B 1 19 18 14 14	M 5 T 5	3 29	1 19 x 17 7 A A 14	41/
6. Waste Description					
CELL 4	5 T A 1 W L E	SSS STE	EL ALPh.	A BOX PACKE	D
7. Numbers of Waste Pa			s Volume	9. Package Radiation at	
Piastic Board Boxes I	Drums Wooden No. Gal. No. Vo	Crates plume-ft³ Amou	1 2	Surface 1 Meter (mr/hr) (mr/hr)	3 2
10. Gross Weight	11. Additional	Description of Packag	ing and Packaging Material	S	
Amount $\begin{pmatrix} K = kilo \\ P = pou \\ T = ton \end{pmatrix}$,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	TEELI	8 0 X	W P R F 0 0 5 3	3 8
12. Radionuclide Conte	nt			SS Materials Writ	te-Off
Nuclide	Amount ±	(M = gram)	or on ount ±	M = measurement Account	oject ode
4 3 8	144 0 0 E +	-0 m 8+3	300 E - 11	A	
P 4 55	3 ,5 0 0 E -	- 1 m 2+1	100E-1	A	
C S 1 3 7	247 100 E-	·11 C +	E	ε	
5 R 9 0	244 6 8 E-	11 C +		e	
Y 9 0	244 6 8 E-	-116		6	
R U 1 0 6	1691719 E	. 3 6			
		ARDA	OVALC		
Waste Generator (Print Nam	ne Here) Romero	HSE-1/-10/-11 Area R	OVALS lepresentative (Print Name Here) L Ault	Additional Signatures (Optional) Russe, Dissipation 191	
Signature certifies that the that ALL applicable accept criteria have been met(Sign		d Signature certifies that handle and transport(it waste package ôr shipment ik sa Signature) UUH	ife to	
13. Date	14. Disposal/Stora	ige Location		15. Shaft Surface Dose	COLERANDER
Disposed M M D D Y / 2 0 5 9	Area Sha'	~	t(s) Layer F	os. mr/hr	
1	nent Representative (Print N	\	Rece AC equirements were met. Date	Date Date Date	rified

Los Alamos
Los Alamos National Laboratory

RADIOACTIVE SOLID WASTE DISPOSAL RECORD

os Alamos, New Me	1	OTE: Read ins	structions on back carefully before	e completing this		7 Waste Man	agement
1. Form Number 32/	Continuation				E	xt. 6095, MS	J592
s 9 1 4.61	2 Potrioveble	4. Origin	of Waste				Waste
2. Date M M D D Y Y	3. Retrievable Serial Number	Group	TA Building	Wing	Program (Code	Code
M M D D Y Y .							
S. Waste Description							
6. Waste Description							
7. Numbers of Waste Pa			8. Gross Volume / M = meter ³		9. Package Rad	liation at	
Plastic Board	Drums Wooder No. Gal. No. V	olume-ft ³	Amount $ \begin{pmatrix} M = Heter \\ F = foot^3 \\ G = gallon \end{pmatrix} $		Surface (mr/hr)	1 Meter (mr/hr)	
Bags Boxes	140. Cdi. 140.	J					
<u> </u>	• • • •						
10. Gross Weight		I Description	of Packaging and Packaging N	aterials			
Amount $ \begin{pmatrix} K = kilo \\ P = pou \\ T = ton \end{pmatrix} $	und)	1 1 1		1 1 1 1		1 1 1	1.
					1,	SS Materials '	Mrito Off
12. Radionuclide Conte	ent	· ·		Amount D	Determined By:	55 Materials	Wille-Oil
Nuclide	Amount	C = curi M = grai	Error on Amount	1	ysis surement	Account	Project Code
R h 1 0 6	/ 9 12 19 E	- 3 c		E			-
	16.6	-2 c	♣ E	e			
M		- 3 C	L I E	ε			
T 6 1 2 5							
B A 1 3 7	2.5 3 3 E	- / C	• E	6			
Pn 147	145 4 2 E	- 2 0	• E	E			
E 4 1 5 5	500 4 9 E	- 3 C	E	E			
			APPROVALS				
Waste Generator (Print Na	me Here)	HSE-1/-16	0/-11 Area Representative (Print Nat	ne Here)	Additional Signati	ures (Optional)	
					,		
Signature certifies that the that ALL applicable accept criteria have been met/Sig	waste is as represented here a stance and disposal/storage inature)	nd Signature handle ar	e certifies that waste package or shipr nd transport(Signature)	nent is safe to			·
					15 Ch-44 C-	urface Dose	
13. Date Disposed	14. Disposal/Sto			er Pos.	mr/hr	unace DOSE	
M M D D Y	Area Sh	all Pil					
LIGE 7 Wests Money	ment Representative (Print	Name Here)		Received	Logbook	Computer	Verified
				Date	Date	Date	Date
Signature certifies that (Signature)	all waste receiving, handling	g, and disposal	/storage requirements were met	Date	Dale	Date	Julio



HS Form Number 10-58 (11/88)

RSWD	Retrievable				
Form Number	Serial Number				
s 9 1 0 3 2 1	01/19/8/4/4				

NONCERTIFIED TRU WASTE SUPPLEMENTAL DATA SHEET

i. Waste Generator's Package Information Organic Material Weight (lb.) Organic Material Volume (%) Internal Shielding Type Thickness (in.) Nonradioactive Hazardous Materials ✓ None Name EPA Code Quantity (g) ☐ Lead E None ☐ Steel E E □ Concrete E E □ Other Internal Packaging Additional Information Plastic bags Number ___ Thickness 4.5 mil ☐ 90-mil HDPE Liner Blocking ☐ Other WPRF Reference Number 00538 The waste described herein was prepared, packaged, and documented such that it meets all of the applicable requirements of AR 10-5 of the Los Alamos Health and Safety Manual. The data are correct and complete to the best of my knowledge. Printed Name. Signature II. GENERATOR SITE HEALTH PHYSICS INFORMATION + 2 Gamma Dose rate (mrem/h) Survey Meter Model RO-3C Property No. Neutron Dose Rate (mrem/h) Survey Meter Model Property No. The data in this section were collected as prescribed in approved procedures. Total Dose Rate (mrem/h) Printed Namel Alpha contamination (dpm/100cm²) Signature Beta-Gamma Cont. (dpm/100cm2) III. HSE-7 AUTHORIZATION The data package for this waste has been reviewed by HSE-7. The generator is authorized to arrange transportation to TA-54. **Printed Name** Signature BAUGELE BA**un** IV. RECEIVING SITE HEALTH PHYSICS INFORMATION Gamma Dose rate (mrem/h) E Survey Meter Model Property No. Neutron Dose Rate (mrem/h) Е Survey Meter Model Property No. The data in this section were collected as prescribed in approved procedures. Ε Total Dose Rate (mrem/h) Printed Name Date Ε Alpha contamination (dpm/100cm²) Signature Beta-Gamma Cont. (dpm/100cm²) E

PACKAGING CONDITION INSPECTION

Los Alamos

Los Alamos National Laboratory

Waste Package
Serial Number
0019844

Drum Lot Code	N/A	Inspection Items	Initials
Year Of Mfgr.	NA	Ring, Bolt, & Nut	NA
Box Serial No.	NA	Lid & Gasket	NA
Comments: container used for	7'	Chime	NA
transportation and storas	a v	Dents	THE
At TA-54 Area 'G' onl	4	Gouges	166
	/	Paint	400
This container has been visually inspected and has b	een found	to be free of damage that would make it unsuitable for TRU waste pa	ackaging.
Name Thing Thomas		Signature Dai	8/23/91
1 4 12 1 2 4 - 12 1 2 1 2	001/20:0	S VISUAL INSPECTION	/ /
Inspection Items	Initials	This waste package was visually inspected at time of pickup as	required by
	2011030213	approved procedures, and was found to be free of obvious	damage or
Filter		defects.	
Labels		Comments	
Damage	<u> </u>		
Closure Ring	<u> </u>	·	
TID Seal No.		Signature Da	te
	111 ~ 5	TA INCOPPORTION	
	111. I <i>P</i>	A-54 INSPECTION	
Weight (lbs.)		This waste package was visually inspected for handling dam	nage before
TID Seal No.	<u> </u>	shipping, and, if the package is a drum, the closure ring bolt wa	as tightened
Comments:		as required by approved procedures.	
Name		Signature Da	ite

HS Form Number 10-5C (11/88)

S nal Laboratory / Mexico 87545

WASTE PROFILE REQUEST

HSE-8 US	SE ONLY							
Reference Number								
00538	,							

in sides of this form using a black or blue pen. Inadequate information will result in processing delays. Leted form to: ATTN: WPRF, MS K490

_					
MST-5	Telephone	Mail Stop G-742	Technical Area	Building	Room
11121-3	667-4653	15-742	TA-3	5m-29	W9-9
Knowledge of Pro	ocess		☐ Chemical/Physica ☐ Request For Analysis	I Analyses (Speci	
Choose one or more o	of the items below which	best describes y	our waste:		
Flammable Combustible High Explosive Oxidizer Pyrophoric Cyanide Heavy Metal Corrosive	Pesticide Beryllium Asbestos Solvent Waste Rags Glass Plating Solution Etchant	Photographic Sanitary Radiochemistry Paint Waste Laboratory Tras Metallurgic Scrap Metal Medical/Biologic	Pump Oil Capacitor Oi UST Remedi	Filter M Vacuur Cemen il Non-Se iation Non-Re	
Additional Description		N MENT	- boxes		
General Description O	f Waste (check at least o	ne block for each	column):		
FORM	FLASH POINT (°F)	рH	REACTIVITY	PCBs	
Solid Cemented Sludge Semi-Solid/Sludge Absorbed Liquid Liquid Gas Multi-Layer Suspended Solids Powder or Ash	Less Than 100 100 to 139 140 to 200 Greater Than 200 None	2.0 or Less 2.1 to 12.4 12.5 or Greater Not Applicable	Unstable Reacts With Cyanides Sulfides Shock Sensi Class A or B	> 500 No PCE tive Explosive	ppm ppm
Indicate Known Rad	lioactivity Of Your Waste	: List Known	Radioistopes:		
Not Radioactive (Go T		Determined	•	Determined By Esti	mate
☐ < 2.0 nC/g ☐ > 2.0 nC/g ☐ > 10.0 nC/g ☑ > 100.0 nC/g	☑ Alphs ☑ Bets ☑ Gamma ☐ Tritium	Radiosotope 2	2. 234 Pu 1 3. MFP 1	Activity/Unit of Measu Activity/Unit of Measu Activity/Unit of Measu Activity/Unit of Measu	re
form is correct. I understan	CATION of the waste, and/or chemical/p od that this information will be r the possibility of fines and impi	made available to reg	ulatory agencies and that	provided regarding the there are significant p	waste specified on this enalties for submitting
Print Generator's Name (Las	st, First Mi)	Z Numb	er Generator/s	Signature	Date
LEDBETTER	JAMES A	1. 07-	1067	"dhethe	4.27-9
	dinator is the custodian of your n, provide the name and mail st	op of this	oup Waste Coordinators N	lame (Last, First Mi) RyLL	Mail Stop 73 C

Heavy Metals (i	indicate whet	her the following	n heav≆ metals (exi⊈ in your	waste, at	the posted		
	None		*.	КОР		TCLP	Oth	
Arsenic	\boxtimes			Z	П	→>□		
Barium	Ф	☐ < 100.0 ppm	≥ 100.0 ppn				\exists	
Cadmium	Ф	☐ < 1.0 ppm	≥ 1.0 ppm	吊			H	
Chromium .	ф.	5.0 ppm	☐ ≥ 5.0 ppm		Ħ		\exists	
Lead	ф.	5.0 ppm	≥ 5.0 ppm	而	H		님	
Mercury	Ф	<0.2 ppm	≥ 0.2 ppm	芾	H		님	and the second s
Nickel		< 134.0 ppm	☐≥ 134.0 ppn	¬ Ж	H		님	
Selenium	Ф	1.0 ppm	☐ ≥ 1.0 ppm	ď	H		믐	
Silver	Ф		☐ ≥ 5.0 ppm	TH.	H		H	
Thallium	(1)	< 130.0 ppm	≥ 130.0 ppm	, तर्ने	H		님	
Organic Compo	unds (indicate	if the following	organic compo	unds exist ir	1 vour was	te at the n	لسا مsted م	Oncentration\.
	None	_		KOP	Analysis	TCLP	Other	oncentration);
Benzene	X	☐ < 0.5 ppm		Ø		-> □	Culei	
Carbon Tetrachi	oride 🗍	<0.5 ppm	☐ ≥ 0.5 ppm		7		닉	
Chlorobenzene	雨	< 100.0 ppm	☐ ≥ 100.0 ppm	, B	8	-> ∐		
Chloroform	Ē.	☐ < 6.0 ppm	≥ 6.0 ppm	' 出	H_			
Cresol	芾	< 200.0 ppm	≥ 200.0 ppm	、	님ㅡ	-> ∐		
1,4-Dichloroben	zene T	☐ < 7.5 ppm	☐ ≥ 7.5 ppm	· #	닠	-> ∐		
1,2-Dichloroetha	ane H	☐ < 0.5 ppm	☐ ≥ 0.5 ppm	#	닉ㅡ	-> ∐	닐	
1,1-Dichloroethy		☐ < 0.7 ppm		- 4	닏ㅡ	-> ∐		
2,4-Dinitrotoluer		< 0.13 ppm			닠ㅡ	> ∐		
Hexachlorobenz	Lugi .	☐ < 0.13 ppm		Ж	닠ㅡ	-> ∐		
Hexachlorobutad		☐ < 0.5 ppm	☐ ≥ 0.13 ppm	· #	닠ㅡ	-> □		
Hexachloroethar		☐ < 3.0 ppm	☐ ≥ 0.5 ppm	出	<u> </u>	-> □		
Methyl Ethyl Ket	-		☐ ≥ 3.0 ppm	. Т		→□		
Nitrobenzene	=	☐ < 200.0 ppm	☐ ≥ 200.0 ppm	' 里	<u></u>	> □		
Pentachlorophen	ene	< 2.0 ppm	☐ ≥ 2.0 ppm	Ψ		→□		
1	" H	☐ < 100.0 ppm	☐ ≥ 100.0 ppm	, Ф		→-□		
Pyridine	4	☐ < 5.0 ppm		q)	Π	→□		
Tetrachloroethyl	ene <u> </u>	< 0.7 ppm		中		> □		
Trichloroethylene	• 4	< 0.5 ppm	☐ ≥ 0.5 ppm			->□		
2,4,5-Trichlorop	henol \coprod	< 400.0 ppm				-> □		
2,4,6-Trichlorop	henol [< 2.0 ppm		₫		→ 🗍	$\overline{\Box}$	
Vinyl Chloride	[3]	< 0.2 ppm		立		→ Ū	ā	
CUEOK ONE								
CHECK ONE								
Additional haz	rardous compone	ints in the waste are	listed below:	There are n	o additional h	azardous cons	tituents i	n this waste.
С	ompound Name		Concentration					Concentration
1.	***************************************		nonconocina de mante de la serie de mançamente de la persona de la composition della	5.		****		
2.		the second secon		6		minimal distribution and a contract of the con		
		Annual desiration of the second secon						And the state of t
4.								(4.0.0.4.4
	HS	SE-8/HSE-7 U	SE ONLY (Do	Not Write	Below T	his Line)		
WASTE CLASSIFICA	ATION		**************************************			**************	CHOCKET BUILDING	
☐ Non-Radioactiv	e. Non-Hazardou	18	Radioac	stiva		— 11		
Solid Wast		.•		v-Level Radioac	aire Mara	Hazard		
	- sted Chemical Wa	asta		nsuranic Waste			ardous V	
Sanitary W				icial Nuclear Mi				Level Waste
	Disposable Wast	Δ	□ she	iciai Nuciear ivi	ateriai	□Mix	ed Irans	uranic Waste
		•						•
Hazardous or N	lixed Waste (Codification:						
Action to the Action of the Company	Waste Code 2	Waste Code 3	Waste Code	4 Waste	Code 5	Waste Code	5 V	Vaste Code 7
HSE-8 Reviewef's Si	· · · · · · · · · · · · · · · · · · ·			Date / /	Cost Cente	r/ProgramCod	e For HS	E Analysis Backcharge
1400	non	or description of the state of		[[]]9/				-
			Page 7	of B				and and the last terms of the same and the

Page 2 of 2



Appendix C

TRU Waste Storage Information, Container S910322 Stored in Shaft 303 This page intentionally left blank.





S910322

Purchase Order #				I	nspected	Items					
	been visually inspected a be free of damage that wo					Ring, Bolt,	and Nut	Chin	ne		ents
packaging.	e nee or damage mat wo	ии таке	il urisuitable io	TRU Wasie		Lid and Ga	sket	Gou	ges	□Р	aint
Printed Name			Sig	nature			Sig. Dat	te	С	per. Dat	e
2. Generator's P	ackage Information										
Group	Technical Area	Building		Cost Cente	r	Prograr	n Code	Cost Ac	count	Wor	k Package
LTP-PTS	54		000000	 							
Additional Infor	mation			☐ DP ☐	No	on-DP If	Non-DP	waste, att	ach D	OE app	roval doc.
						Ra	adionuc	lide Conte	ent		
											C= Curie
	1			Nuclide			ount		ertain	-	M = Gram C
Container		Liner		Am-241		3.091			00E+		С
Steel Drum (✓ Nor		Cs-137		7.950			00E+		
☐ Pipe Overpad	· ·	_	mil liner	Pu-238		1.028			00E+		С
Steel Drum (85 gal Overpack)	=	mil liner	Pu-239		5.2071			00E+		С
Standard Wa	ste Box	☐ Fibe	erboard Liner	Pu-240		3.344			00E+		С
Standard Wa	ste Box Overpack		I Shielding	Pu-241		1.065			00E+		С
RH Canister		✓ Nor	ne	Pu-242		1.198	E-005	0.000E+000		000	С
Other (Call T	WCO)	Type	Thickness	Ru-106		5.827	E-003	0.0	00E+	000	С
Filter Serial No.				Hazardous Materials							
Tiller Serial No.	02					Name			EP/	Code	Qty (g)
Waste Profile Nu	ımber 5339	3 (WS	ID 37017)							
Gross Weight (lb	o.)		6.20E+003								
Net Weight (lb.)			4.60E+003								
Shipping Catego	ry										
LANL Waste Stre	eam ID		TA-03-27								
TRUCON Code											
Date Closed (MN				Accumulation	on S	Start Date	(MM/DD)/YY): 12	2/04/		
	ction were collected, an	d waste	described here	n was packaged	was packaged and labeled according to approved procedures.						
Printed Name				Signature					Date:		
3. Generator Site	Health Physics Inf	ormatio	n						I		
	ate (mrem/h) (contac			Survey Date	Sı	urvey Meter	Model	Property Nu	ımber	Calibrat	ion Void Date
Neutron Dose Rate (mrem/h) (contact)			Survey Date	Survey Date Survey Meter Model Property Number Calibration Void D					ion Void Date		
Total Dose Rate (mrem/h) (contact)											
Total Dose Rate (mrem/h) (1 meter)			The data in t	his s	section were	collecte	d accordina	to appr	oved pro	ocedures.	
Alpha Contamina	ation (dpm/100cm2)			Printed Name				<u></u>	1-15-	Date	
Beta-Gamma Co	ont (dpm/100 cm2)			Signature							



Printed Name



Date:

4. TRU Waste Management Review/Authorization

The data package for this waste has been reviewed. Basedon the information provided, this waste meets the WAC requirements for storage at TA-54.					Printed Name Date: Signature						
E Dual and Viewal In											
according to approved	This waste package was visually inspected prior to transport according to approved procedures. It meets WAC packaging and labeling requirements and is free from obvious damage and					Printed Name Date:					
defects.											
6. Receiving Site H	ealth Physics Inf	ormation		-							
Gamma Dose Rate (mrem/h) (contact)				Survey D		Survey Meter Mo		operty Number	Calibration Void Date		
Neutron Dose Rate	(mrem/h) (contac	t)		Survey D	ate	Survey Meter Mo	del Pro	operty Number	Calibration Void Date		
Total Dose Rate (m	rem/h) (contact)										
Total Dose Rate (m	rem/h) (1 meter)					is section were col	lected ac	ccording to app	proved procedures.		
Alpha Contamination	n (dpm/100cm2)			Printed N	lame				Date		
Beta-Gamma Cont	(dpm/100 cm2)			Signature							
7. Storage Site Info	rmation										
Received by (Initials)		Date Receiv	red	Original Storage Data							
This waste package w					Building Number Layer			Row Number			
and in good condition. procedures.	It was accepted an	d inspected a	eccording to a	approved	Colu	olumn Number Da		Date Stac	cked (MM/DD/YY)		
Printed Name			Date:		Printed Name				Date:		
Signature					Signature						
8. Waste Acceptant	ce Office										
Intials/Date				W	/E De	escription					
NCR Number	Intials/Date					NCR Descri	otion				





9. Continuation Sheet for Radionuclide Content (from Page 1, Section 2)

			C= Curie
Nuclide	Amount	Uncertainty	M = Gram
Sr-90	7.266E-001	0.000E+000	С
U-234	2.642E-004	0.000E+000	С
U-235	8.249E-006	0.000E+000	С
U-236	1.088E-006	0.000E+000	С
U-238	7.626E-008	0.000E+000	С
Y-90	7.266E-001	0.000E+000	С

10. Continuation Sheet for Hazardous Materials (from Page 1, Section 2)

Hazardous Materials					
Name	EPA Code	Qty (g)			
No Additional Hazardous Materials					



S910322 T-TTRU-TEMP

Status:

WS ID: 37017 C ID: 769768 Opt ID: B19960 ACTIVE

ACTIVE

SC: Shield cask

04-Dec-1991

Remotely handled canister

04-Dec-1991 12:00 am

NO

GENERAL INFORMATION

Decommissioned:

Container Subtype:

Accum Start Date:

Container Type:

Origin Date:

Closed Date:

Container ID: 769768 **Labeled ID:** S910322

Optional ID: B19960

Chemical Barcode:

Physical State: SOLID
Waste Stream ID: 37017

Work Path: T-TTRU-TEMP

Quantity (Univ):

Compactible:

Discard Matrix:

TID(s):

Gen Contact:

Insert By:

Waste Desc:

By: WCATS APPLICATION (000000)

GENERATED AT 03-00029

WEIGHTS AND VOLUMES

Container Volume: 10.20 CM Gross Weight: 6201.12 lb

Waste Volume: NOT SPECIFIED Tare Weight: 1600.00 lb

Net Weight: 4601.12 lb

LOCATION

Pickup (Origin): LANL: 03-CMR: GEN-AREAS

Current: LANL: 54-G-DISP: SHAFT303



CONTAINER PROFILE S910322 T-TTRU-TEMP

WS ID: 37017 C ID: 769768 Opt ID: B19960 ACTIVE

PAYLOAD INFORMATION

Container Procurement

P.O. Number: Year of Manuf:

Lot No.: Serial No:

Solution Package: 53: SP BG - Hot Cell Liners

TRUCON Code:

Shipping Category:

CCP AK Report:

WIPP Waste Stream: TA-03-27: COMBINED COMBUSTIBLE AND NONCOMBUSTIBLE

Matrix Code:

Defense Waste: Equiv. Comb. Matrix:

Adeq. Ventilation: Compliant Metal Cont.: YES

Overpack (1 to 1): NO Retrievable: BIR WS Code: LA-RM14

Content Code:

COST CODES							
Cost Center	Prog Code	Cost Account	Work Package	Percent Allocation	Cost Center Status	Cost Code Status	Recharge Mode
	X77A			100.00			SELECTION LIST

		EPA CODES
System	Hazardous	
Code	Waste No.	Waste Description & Treatment Subcategory



CONTAINER PROFILE \$910322 T-TTRU-TEMP

WS ID: 37017 C ID: 769768 Opt ID: B19960 ACTIVE

	RADIONUCLIDES							
Nuclide	Amount	Unit	Uncert	MT Derived (Y/N)	Activated (Y/N)	MDA Result (Y/N)	Normal Form (Y/N)	Measurement Code/Comment
Status: Activ	ve, Assay Page:	338172, 1	Date: 12/04/199	1, Deriv	∕ation: G	enerat	or Ente	red Results (e.g., Offsite Assay)
38	4.10E+000	g	0.00E+000	N				NONE
55	1.00E+000	g	0.00E+000	N				NONE
Am-241	3.09E-002	Ci	0.00E+000	Y			Y	
Cs-137	7.95E-001	Ci	0.00E+000	N			Y	
Pu-238	1.03E-002	Ci	0.00E+000	Y			Y	
Pu-239	5.21E-002	Ci	0.00E+000	Y			Y	
Pu-240	3.34E-002	Ci	0.00E+000	Y			Y	
Pu-241	1.07E+000	Ci	0.00E+000	Y			Y	
Pu-242	1.20E-005	Ci	0.00E+000	Y			Y	
Ru-106	5.83E-003	Ci	0.00E+000	N			Y	
Sr-90	7.27E-001	Ci	0.00E+000	N			Y	
U-234	2.64E-004	Ci	0.00E+000	Y			Y	
U-235	8.25E-006	Ci	0.00E+000	Y			Y	
U-236	1.09E-006	Ci	0.00E+000	Y			Y	
U-238	7.63E-008	Ci	0.00E+000	Y			Y	
Y-90	7.27E-001	Ci	0.00E+000	N			Y	



CONTAINER PROFILE \$910322 T-TTRU-TEMP

WS ID: 37017 C ID: 769768 Opt ID: B19960 ACTIVE

RAD CALCULATIONS

Total Activity (nCi/g): 1.65130E+03 DOTFissile Mat (g): 4.66464E+00

Alpha (nCi/g): 6.08575E+01 Transport Index:

TRU Alpha (nCi/g): 6.07139E+01 NRC Class: C

Pu-239 FGE: 3.31894E+00 **DOT Type:** B

 Pu-239 FGE [2U]:
 3.31894E+00
 LSA-I Fraction:
 1.32930E+02
 N

Pu-239 Eq-Ci: 1.49186E-01 **LSA-II Fraction:** 2.67185E-02 Y

Pu-239 Eq-Ci [2U]: 1.49186E-01 **LSA-III Fraction:** 1.33593E-03 Y

TRU Pu-239 Eq-Ci: 1.47197E-01 **Reportable Quantity:** 2.18787E+01 Y

TRU Pu-239 Eq-Ci [2U]: 1.47197E-01 * **ALC Ratio:** 7.87863E+06 NE

Decay Heat [U] (W): 9.87538E-03 * **ACM Ratio:** 3.98791E+03 NE

Tritium (Ci/m3): 0.00000E+00 **Limited Quantity:** 5.57624E+03 N

TRU ECW PE-Ci: 1.47197E-01

Weight/Volume Used:

1 Container Net Weight: 2.08703E+03 kg *ALC (Activity Limit for Exempt Consignment)
2 Container Volume: *ACM (Activity Concentration for Exempt Material)

U = 1 Uncertainty, 2U = 2 Uncertainty

TASK HISTORY					
Date/ Time	Task ID/ Status	Task Name/ Storage or Disposal Grid Location	Reject		
12/05/1991 12:00 AM	1784396 EXECUTED	LANL:03-CMR » 54-G-DISP:SHAFT303	NO		

Note: Highlighted row indicates container was output or receiving container for the indicated task

DOCUMENTATION

Doc. Number Title Uploaded By

I S910322-TWSR WCATS APPLICATION

(000000)

(000000)

COMMENTS

Date Time/
User Name Comment

08/23/2013 9:37 AM CELL2 STEEL ALPHA BOX IN STEEL BOX PUT RH SHAFT WPRF# 00538

WCATS APPLICATION (000000)

EDIT LOG

Date Time/ Quality

User Name Record Explanation



CONTAINER PROFILE \$910322 T-TTRU-TEMP

WS ID: 37017 C ID: 769768 Opt ID: B19960 ACTIVE

EDIT LOG				
Date Time/ User Name	Quality Record	Explanation		
08/23/2013 9:45 PM WCATS APPLICATION (000000)	NO	TRUP.TRUPKG TABLE (WASTEDB): [PKG_ID] = S910322, [ALPHA_CONT] = , [APPROVE_BY] = , [APPROVE_DATE] = , [BETA_GAMMA_CONT] = , [BLDG_CD] = 03-00029, [BX_SERIAL] = , [CERT_STATUS] = , [COLOR_CD] = , [COMMENTS] = CELL2 STEEL ALPHA BOX IN STEEL BOX PUT RH SHAFT WPRF# 00538, [CONTENT_CODE] = , [CONTROL] = , [DATE_CLOSED] = , [GAMMA_DOSE] = , [GROSS_WT] = 6201.1215, [GRP] = MST5, [NEUTRON_DOSE] = , [NORMAL] = , [OLDDRUMNUM] = B19960, [OLDVOL_UNIT] = F, [OLDWT_UNIT] = T, [ORG_VOL] = , [ORG_WT] = , [PKG_CD] = 04, [PKG_CD_DESC] = REMOTELY HANDLED CANISTER, [PKG_DATE] = 1991-12-05 00:00:00, [PKG_FISS_GRAMS] = 3.30751854076259228749266829699551931349, [PKG_LOT] = , [PKG_PE_ACT] = . 147365211005458615741365684422476375966, [PKG_TARE_WT] = 1600, [PKG_VOLUME] = 10.195, [PROC_BTCH_CD] = , [PROG_CODE] = X77A, [ROOM] = X77A, [SAMPLE_ID] = , [THERMAL] = .009822326337818870405005068313547558088, [TOTAL_DOSE] = 700, [TOT_ANCG] = 60.9837077095860751211173204303937032179, [TRUCON_CD] = , [WASTE_CD] = 52, [WPRF_CD] = , [YR_MFG] = , [WASTE_TYPE] = , [INSP_DATE] = , [AUA_VUA] = , [PROCESS_ID] = , [WGEN_CD] = , [DOT_TYPE] = , [BIR_ID] = LATR05, [RQ] = , [LSA_SCO_CD] = , [LSA] = , [A_START_DATE] = , [BIR_WS] = LA-RM14, [LA_WS] = TA-03-27, [SWBOP] = , [WASTE_STREAM] = , [OFFSITE] = , [LINER_CD] = , [NET_WT] = 4601.1215, [SHIP_CD] = , [WASTE_STREAM] = , [OVERPACK] = N, [REPACKED] = , [INVENTORY_NO] = , [INVENTORY_DT] = , [CHCD_CC_CD] = , [CHCD_CA_CD] = , [CHCD_WP_CD] = , [DOT_DP] = , [WASTE_VERIF] = , [VERIF_COMPLETE] = , [HDL_CD] = , [UPD_WHEN] = 2004-07-02 12:08:37, [UPD_WHO] = 114644, [PHY_STATE] = S, [PKG_H3_ACT] = 0, [QTW] = N, [AK_REPORT] = , [STP] = 0		
08/23/2013 12:33 PM WCATS APPLICATION (000000)	NO	TRUP.UPD_HISTORY TABLE: [UPD_ID]= 12683, [AUTH_BY]= 113199 -> CHRISTENSEN DAVIS V , [AUTH_NUM]= SR318, [PKG_ID]= S910322, [UPD_WHEN]= 03-26-1996, [UPD_WHO]= Z111142 -> LONGLEY JOHN M , [WHAT]= tgrams, tcuries, fiss_grams, thermal, pkg_pe_act,pkg_fiss_grams, [WHY]= Correct errors		
08/23/2013 8:48 AM WCATS APPLICATION (000000)	NO	INITWORKPATH (C_ID=769768/PATH_ID=465): SKIPPED (NO WORKPATH UNITS)		

Los Alamos

Los Alamos National Laboratory

RADIOACTIVE SOLID WASTE DISPOSAL RECORD

NOTE: Read instructions on back carefully before completing this form.

1. Form Number						,				ГН	ISE-7 Waste N	Management
0000										'	Ext. 6095.	_
s 9 1 P32 2												
2. Date	3. Retrievable Serial Num		4. Origin o	1 Waste	TA	Building		Wing		Progr	am Code	5. Waste Code
MMDDYY	OCHIAI IVAIII	-	Gloup			Building				riogia	an code	
082391	01199	760	MST	5	3		29		19	メノフ	7 A	A 4 /
6. Waste Description												
CECL 2	STAI	NLE	5 5 5	TE	CL	AC	PAA	1 8	0	×	PACL	ED
7. Numbers of Waste Pa	ckages			8. Gross	Volume	•] [9. Pa	ackage	Radiation at	
Card-	Drums	Wooden	Crates		111	/I = metei	1		Surfa	ace	1 Me	eter
Plastic Board Bags Boxes	No. Gal.	No. Vo	lume-ft ³	Amou	nt \	3 = gallor	n /	-	(mr/	hr)	(mr	/hr)
				2.1.						.		
		•		360	•o F				1	70	0	120
10. Gross Weight	11	I. Additional	Description o	f Packagi	ng and l	Packagin	g Materials	3				
K = kilo P = pou	gram \ 7	TIME CA	psule A	Hache	J 40	box						
Amount T = fon	····· / / /		TEE		8 0 X				UP	RF	00	5 3 8
	4										•	
341 T				-							10014 : :	
12. Radionuclide Conte	nt							Amount	Deterr	mined B		als Write-Off
			(C = curie M = gram	Erro	or on			A = ana	lysis	\		Project
Nuclide	Amount	1	:		ount		± (M= me E= est	asurer mate	ment)	Account	Code
u 3 8	4.11	E +	OM	2.0	e	E	+0	A				
1	1.0	E +	- 0 M	6+4	_	E	- 1	A				
1455	100	1 1 7		U + 4	? l							
C 5 1 3 7	7+95	E -	1 6	•		E		E				
5 R 90	7+216	, 6 E -	1 6	•		E		E				
Y 9 0	7.214	. 6 E-	116			_E		E				
1 7 0				T .								
R4106	5 8 2	7 7 E -	3 0	•		E		=				
				APPR	OVALS	3						
Waste Generator (Print Nar	me Here)		HSE-1/-10	/-11 Area R	epresenta	tive (Print	Name Here)		Addit		gnatures (Optio	onal)
TobiAs J	Komer		Kei	met	-4_	HU	117	7:	-2	1,000	Julu	
Signature certifies that the that ALL applicable acception criteria have been met(Signature)	waste is as repre- tance and disposa	sented here and ii/storage	b Signature handle and	ceruites tha d /f ransport(\$	t waste pa Si <mark>gnature</mark>)	ckage or s	nipmerlt is sa	ie to	i			
1 1	<i>(, //</i>		1	K_{N}	0,	sVF	_					
100	former.									45 Ob-		
13. Date Disposed	14. Di	sposal/Stora							-		ft Surface Do	ose
M M D D Y	Area	Shaf	t Pit	Post	(S)		Layer F	os.				
12059		30	13		\Box					<u> </u>		
HSE-7 Waste Manager	nent Represent	tative (Print N	ame Here)				Rece		Logb		Compute	er Verified
ANDROY	i. Catan	ACH		etorboe ro	quireme	nts were	met. Date	-	AC Date		Date	Date
Signature certifies that (Signature)	all waste receiv	ring, nandling.	JCUM -	Situage 16	чиненне	NO WOIG I	לבו בו	5	12/	5		
Form Number HS 10-2A (12	2/89)		<u>000 0: -</u>									

Los Alamos Los Alamos National Laboratory

RADIOACTIVE SOLID WASTE DISPOSAL RECORD

Los Alamos, New Me	exico 87545 NC	TE: Read instructions of	on back carefully befo	re completing this f		
1. Form Number 322	continuation					te Management 95. MS J592
s 9 1						
2. Date	3. Retrievable Serial Number	4. Origin of Waste Group	TA Building	Wing	Program Code	5. Waste Code
MMDDYY		Group	7A Building	1 1 1 1	1 iogram oddo	
6. Waste Description				•		
						, , , ,
7. Numbers of Waste Pac			Volume		. Package Radiation	at
Card- Plastic Board	Drums Wooden		$ \begin{pmatrix} M = meter^3 \\ F = foot^3 \end{pmatrix} $			Meter mr/hr)
Bags Boxes N	No. Gal. No. Vo	lume-ft ³ Amou	nt G = gallon /		(1117111)	,
			•			
	11 Additional	Description of Packagi	ng and Packaging M	atorials		
10. Gross Weight K = kilog P = pou		Description of Fackage	ng una rackaging m			
Amount $P = pou T = ton$	na)					
						
					SS Mo	terials Write-Off
12. Radionuclide Conter	nt			Amount De	etermined By:	terials write-Oil
		(M = gram)	or on Dunt ±	A = analy M = meas	rsis surement Acco	Project unt
Nuclide	Amount ±	Amo	Juni I	\ E = estim	ate /	Code
R L 1 0 6	5.8 2 7 E -	3 6		6		
R L 106						
5 6 1 2 5	3 4 2 3 6 E -	20 •	E	E		
TE 125	14314 4 E-	20	E	E		
BA 137	7 4 4 5 7 8 -	110	I I E	$ \epsilon $		
Pm 147	4 + 5 3 9 E -	2 4	E	E		
E 4 1 55	1.4 8 7 E-	2 0	E	$ \mathcal{E} $		
		APPR	OVALS			
Waste Generator (Print Nam	ne Here)	HSE-1/-10/-11 Area R	epresentative (Print Nan	ne Here)	Additional Signatures (C	ptional)
Signature certifies that the that ALL applicable accept criteria have been me(Sign	waste is as represented here an ance and disposal storage	Signature certifies that handle and transport(\$	t waste package or snipn Bignature)	ient is sale to		
criteria have been metolyii	atore)					
13. Date	14. Disposal/Stora	ge Location			15. Shaft Surface	Dose
Disposed	Area Shat		(s) Lay	er Pos.	mr/hr	
M M D D Y		13	TI			•
	nent Representative (Print N			Received L	ogbook Comp	outer Verified
	CATANACH			AC	AC	
Signature certifies that	all waste vece:vivg, handling.	and disposa/storage re	quirements were met.	Date 12/<	Date Date	Date
(Signature) Form Number HS 10-2A (12	/89)			1, -1, -1,		

Los Alamos

Los Alamos National Laboratory Los Alamos, New Mexico 87545

R	SWD	
Form	Number	

Retrievable Serial Number

s 9 1 0 3 2 2 0 1 9 9 6 0

NONCERTIFIED TRU WASTE SUPPLEMENTAL DATA SHEET

I. Waste Generator's Package Information Organic Material Weight (lb.) • 0 E + Organic Material Volume (%) 0 Internal Shielding **Nonradioactive Hazardous Materials** Type Thickness (in.) ■ None Name EPA Code Quantity (g) ☐ Lead NONE. ☐ Steel E □ Concrete Ε ☐ Other F Ε Internal Packaging Additional Information Plastic bags Stainless steel ALPHA containmen Number Thickness ☐ 90-mil HDPE Liner K Blocking □ Other The waste described herein was prepared, packaged, and documented such that it meets all of the applicable requirements of AR 10-5 of the Los Alamos Health and Safety Manual. The data are correct and complete to the best of my knowledge. Signature Komero II. GENERATOR SITE HEALTH PHYSICS INFORMATION Gamma Dose rate (mrem/h) Survey Meter Model Property No. 002691 005213 Neutron Dose Rate (mrem/h) Survey Meter Model Property No. The data in this section were collected as prescribed in approved procedures. Total Dose Rate (mrem/h) Printed Name Date 6 Alpha contamination (dpm/100cm²) . 0 Signature Beta-Gamma Cont. (dpm/100cm²) III. HSE-7 AUTHORIZATION The data package for this waste has been reviewed by HSE-7. The generator is authorized to arrange transportation to TA-54. BRUCE LE BRUN **Printed Name** Signature IV. RECEIVING SITE HEALTH PHYSICS INFORMATION Gamma Dose rate (mrem/h) Survey Meter Model Property No. Neutron Dose Rate (mrem/h) Survey Meter Model Property No. The data in this section were collected as prescribed in approved procedures. E Total Dose Rate (mrem/h) Printed Name Date Εĺ Alpha contamination (dpm/100cm²) Signature

Εĺ

Beta-Gamma Cont. (dpm/100cm²) HS Form Number 10-5B (11/88) LOS Álamos Los Alamos National Laboratory Los Alamos, New Mexico 87545

WASTE PROFILE REQUEST

HSE-8 USE ONLY	•
Reference Number	-
00535	

Complete both sides of this form using a black or blue pen. Inadequate information will result in processing delays. Send completed form to: ATTN: WPRF, MS K490

Division/Group	Telephone	Mail Stop		Building	Room
MST-5	667-4653	6-742	TA-3	5m-29	W9-9
					1 1
⊠ Knowledge of Pr	ocess		Chemical/Physical	Analyses (Specify	Polovy
MSDS Attached					1
			Request For Analysis	Analysis	Attached
Choose one or more	of the items below which	hest describes v	our waste		
		, ,	ou. ***astc.		
Flammable	Pesticide	Photographic	Spent Coolan	t Plastics	
Combustible	Beryllium	Sanitary	Aerosol Cans	<u></u>	dia
High Explosive	Asbestos	_		—	
	—	Radiochemistry			Filter Sludge
Oxidizer	Solvent	Paint Waste	Pump Oil	Cement	Paste
Pyrophoric	☐ Waste Rags	Laboratory Tra	sh Capacitor Oil	☐ Non-Salv	/ageable
Cyanide	Glass	Metallurgic	UST Remedia	ition Non-Rec	vclable
Heavy Metal	Plating Solution	Scrap Metal	Soils	Building	
Corrosive	Etchant	☐ Medical/Biologi	-		
		iviedical/biologi	Cai Citationments	I Firing Sit	e Debris
Additional Descriptio	- /O-*io!\		· · · · · · · · · · · · · · · · · · ·		
		· · · · · · · · · · · · · · · · · · ·	- 6		
\mathcal{U}_{I}	OHA CONTAI	NMENT	boxEs		
•					
General Description (Of Waste (check at least o	one block for eac	h column):		
	•				
FORM	FLASH POINT (°F)	pΗ	REACTIVITY	PCBs	
		•			
⊠ Solid	Less Than 100	2.0 or Less	☐ Unstable	☐ < 50 ppr	m
Cemented Sludge	100 to 139	2.1 to 12.4	Reacts With	Water 50-500	nom
Semi-Solid/Sludge	140 to 200	12.5 or Greate		>500 p	
		·			
Absorbed Liquid	Greater Than 200	Not Applicable	=	No PCBs	1
Liquid	None		Shock Sensit	ive	
☐ Gas			Class A or B	Explosive	
Multi-Layer			Non-Reactive		
Suspended Solids					
Powder or Ash					
La Caraca Karana Ba	11		B. C.		
Indicate Known Ra	dioactivity Of Your Waste	e: List Know	n Radioistopes:		
Not Radioactive (Go	To Next Section)	Determined	d By Assay	Determined By Estin	nate
_		-	, ,		
T < 3.0 = C/a	52 Alpha	Radiosotope	1. 235 LL A	ctivity/Unit of Measure	$\omega \Delta \Delta$
☐ < 2.0 nC/g	Alpha			,	
☐ > 2.0 nC/g	Beta	Radiosotope	2. 234 Pu A	ctivity/Unit of Measure	•
> 10.0 nC/g	⊠ Gamma	Radiosotope	3. MF P A	ctivity/Unit of Measure	e /
	Tritium	i !		ctivity/Unit of Measure	P
	_	Madiosotopa	7. VI PT 7	CHAICALOUNIC OF MIGGSON	·
GENERATOR CERTIF	ICATION				
+		//			
	e of the waste, and/or chemical		•		
	and that this information will be g the possibility of fines and imp			mere are significant pe	mandas ivi submitting
. 2.35 millioniadon, moleum	g possionity or infes and mi				
Print Generator's Name (L	ast, First Mi)	Z Num	ber Generator's	Signature	Date
,	•		X T	- / .1	
LEDBETTE	1 TAMES 1	n. 07	7067 Je	Shotten	6.77-9
					7 31-1
	ordinator is the custodian of you		roup Waste Coord(nators N	ame (Last, First Mi)	Mail Stop
,	on, provide the name and mail :	stop of this	, ,	i i	10 750
person (optional).		16.	ARCIA DA	RyLL	15 150
Form 1346 (4/91)		Page 1 c	· · · · · · · · · · · · · · · · · · ·	Com	plete Reverse Side
Form 1346 (4/91)		rage i c	J1 6	50111	DIG 010 F0130 0100

Vaste Code 1	Waste Code 2	Waste Code 3	Waste Code 4	Waste (Cost Center/Program		
	Waste Code 2	Waste Code 3	Waste Code 4	Waste	Code 5 Waste Co	de 6 Waste C	ode 7
· · · · · · · · · · · · · · · · · · ·	BIEDTE NOVILL	councation:					
Hazardous or N	/lixed Waste	Codification					
Other Non-	Disposable Was	te					
Sanitary W			☐ Spec	cial Nuclear Ma	terial	Mixed Transuranic V	Vast e
	ated Chemical W	/aste		suranic Waste		Mixed Low-Level Wa	ste
Solid Wast				-Level Radioact	tive Waste	Hazardous Waste	
Non-Radioactiv		us	Radioac	tive .	☐ Haz	ardous or Mixed	
VASTE CLASSIFIC	ATION						
	Н	SE-8/HSE-7 U	SE ONLY (Do	Not Write	Below This Lin	e)	
4.							
3.				7			
							
2				6.			
-				ɔ			
1.				_			
c	ompound Name		Concentration				centration
∐ Additional ha	zardous compon	ents in the waste are	listed below:	There are no	additional hazardous o	onstituents in this w	aste.
CHECK ONE							
,	4	0.2 ppm	□ <u> </u>	Œ	<u> </u>		
Vinyl Chloride	1 8 1	☐ < 0.2 ppm	≥ 2.0 ppm ≥ 0.2 ppm	LJI Na			
2,4,6-Trichlorop			☐ ≥ 400.0 ppm ☐ > 2.0 ppm	#	☐ 		
2,4,5-Trichlorop	henoi H	☐ < 0.5 ppm	☐ ≥ 0.5 ppm		<u> </u>		
Tetrachloroethy Trichloroethylen	ene III	☐ < 0.7 ppm	☐ ≥ 0.7 ppm	₽	$\square \longrightarrow \square$		
Pyridine Tetrachioroethy	<u></u>	☐ < 5.0 ppm		₫	□ > □		
Pentachloropher	not 🗓	☐ < 100.0 ppm	☐ ≥ 100.0 ppm	Φ			
Nitrobenzene	Ф	☐ < 2.0 ppm	☐ ≥ 2.0 ppm	8888888			
Methyl Ethyl Ke	tone 🗇	☐ < 200.0 ppm	□ ≥ 200.0 ppm	苗			
Hexachloroetha	n• 🛗	☐ < 3.0 ppm	☐ > 3.0 ppm	\mathbb{H}			
Hexachlorobuta		☐ < 0.13 ppm	≥ 0.13 ppm ≥ 0.5 ppm	\mathbb{H}			
Hexachlorobenz	<u>-</u> -		 ≥ 0.13 ppm ≥ 0.13 ppm	#	☐ > □		
2,4-Dinitrotolue	· —	☐ < 0.7 ppm	☐ ≥ 0.7 ppm	#			
1,2-Dichloroeth 1,1-Dichloroeth		☐ < 0.5 ppm	☐ ≥ 0.5 ppm				
1,4-Dichlorober		☐ < 7.5 ppm	☐ ≥ 7.5 ppm	<u> </u>	$\square \longrightarrow \square$		
Cresol	T	☐ < 200.0 ppm	☐ ≥ 200.0 ppm	Φ	$\square \longrightarrow \square$		
Chloroform	里	☐ < 6.0 ppm			$ \longrightarrow \bar{\Box} $	ā	
Chlorobenzene	中	☐ < 100.0 ppm	☐ ≥ 100.0 ppm	Ф	□ -	ā	
Carbon Tetrachi	oride 🗍	<0.5 ppm	☐ ≥ 0.5 ppm		$\overline{\Box} \longrightarrow \overline{\Box}$		
Benzene	烒	○ < 0.5 ppm	≥ 0.5 ppm	Ø			
	None	· · · · · · · · · · · · · · · · · · ·		KOP	Analysis TCLP	other	ration):
Organic Compo	unds (indicat	e if the following	organic compou	الإلا Indsexistin	your waste, at the	L posted concept	ration).
Thallium	ibi	☐ < 130.0 ppm	≥ 5.0 ppm ≥ 130.0 ppm	T T			
Silver	出	< 1.0 ppm < 5.0 ppm	□ ≥ 1.0 ppm □ ≥ 5.0 ppm	щ			
Selenium	#	☐ < 134.0 ppm	☐ ≥ 134.0 ppm	#			
Nickel	\mathbb{H}	☐ < 0.2 ppm	☐ ≥ 0.2 ppm	Ψ			
Lead Mercury	38888888	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	988888			
Chromium	4	☐ < 5.0 ppm	≥ 5.0 ppm	Ф	$\overline{\hspace{1cm}} \longrightarrow \overline{\hspace{1cm}}$		
Cadmium	里	☐ < 1.0 ppm		重	$\Box \longrightarrow \Box$	H	
Barium		☐ < 100.0 ppm	☐ ≥ 100.0 ppm			Ï	
Arsenic	\boxtimes	☐ < 5.0 ppm	≥ 5.0 ppm	\square			,
	None	ther the following		KOP	TCLP	Other	

DATE:		7/2/91								
TO:	<u>J</u> .	Ledbetter, MST-	5,	6742						
FROM	: Juai	n C. Corpion, HSE-8, MS K4	90							
SUBJ:	3J: WASTE PROFILE REQUEST (WPR)									
The HSE-8 Hazardous and Solid Waste Section has reviewed and logged the information you provided on the attached WPR(s). Based on the information you provided, your waste(s) is:										
A. Nor	n-radi	ioactive/Non-hazardous								
		Solid waste	0	Non-regulated chemical						
		Sanitary waste		Other non-disposable waste						
B. Radi	ioacti	ive								
		Low-level	9	Transuranic						
		Nuclear Material								
C. Hazardous or Mixed										
		Hazardous	0	Mixed low-level						
	o	Mixed transuranic								
valid for same.	or on Shou	e year or as long as the com	posit	(s) in your files for at least 3 years. This WPR(s) is tion of the waste you have characterized remains the new WPR to HSE-8 and attach a copy of the WPR						
Attach	ment	t(s)								

PACKAGING CONDITION INSPECTION

Los Alamos

Los Alamos National Laboratory

Waste Package Serial Number

0019960 Los Alamos, New Mexico 87545 I. GENERATOR'S PRE-USE VISUAL INSPECTION Initials Inspection Items Drum Lot Code Ring, Bolt, & Nut Year Of Mfgr. Lid & Gasket Box Serial No. Chime Comments: Dents Gouges Paint This container has been visually inspected and has been found to be free of damage that would make it unsuitable for TRU waste packaging. Signature II. DRIVER'S VISUAL INSPECTION This waste package was visually inspected at time of pickup as required by Initials Inspection Items approved procedures, and was found to be free of obvious damage or Filter defects. Labels Comments Damage Closure Ring TID Seal No. Date Signature Name III. TA-54 INSPECTION Weight (lbs.) This waste package was visually inspected for handling damage before TID Seal No. shipping, and, if the package is a drum, the closure ring bolt was tightened Comments: as required by approved procedures. Date Signature Name

HS Form Number 10-5C (11/88)

Page 1 of 4

ITEM & PACKAGING DESCRITION

SM 29 RM WING 9 CELL 2 ORIGINATING LOCATION: TA 3

DATE 8/20/9/ ORIGINATOR J. LEDBETTER

9

က

GROUP MST-5

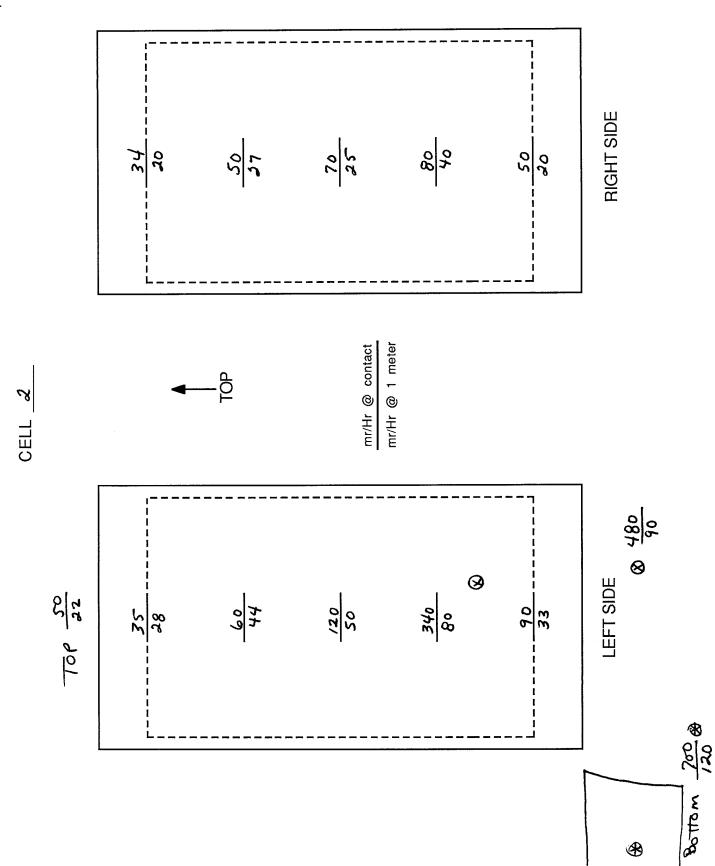
250 8 % 30 27 260 छछ mr/Hr @ contact mr/Hr @ 1 meter 9

alpha box

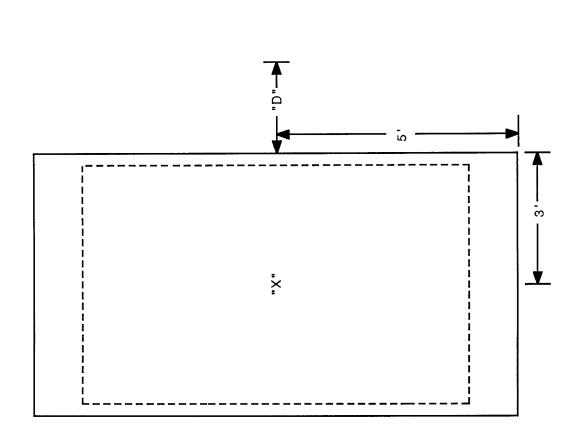
FRONT

300

BACK



FISSILE CONTENT MEASUREMENT CELL 2



"D")	"X" (mr/Hr)	
(Distance from		•	•	
surface of box)	Front	Back	Left side	Right side
* 10'	20	15	20	//
11.	17	13	18	6
12'	12	6	/2	8
13'	01	52	10	6.5
14.	0/	2	9.5	و
15'	6	6.5	9	5

Point source readings are taken atthe centerline of the box. The total distance for calculation is 13 feet (4 meters). Antiground Dose-rate = 0.6 mm/hr

P/N 003/83 Instrument Mc-64

Calibration Void 10/24/91

Survey By Thomero, mst-5 Date 8/21/91

Page 4 of 4

NARRATIVE CELL 2

Contained within steel box #2 is cell 2 alpha box from Wing-9 of the CMR Building.

The gross weight of box #2 is 6,250 lbs. The alpha box weight is 3,500 lbs.

Alpha Cell #2 went hot in October of 1984 and was used sparsely until October 1986 to examine a few FFTf fuel pins. It was used for 9 months in 1989 for removal of sodium from intact fuel pins and a large number of residual sections. All the fuel was shipped to above ground storage at Richland, Washington. It was remotely decontaminated and removed from service in January 1990. The main contaminants are Pu²³⁹, U²³⁵, mixed fission products. The estimates of gram weight shown on the RSWD form are calculated from measurements taken at 4 meters. A procedure for the calculation is included in this package.

The internal alpha box has been secured in a manner for easy removal. The lid has been welded at the 4 corners. Cut or grind the corners free and remove the lid. Remove the 4 bolts holding the brackets to the alpha box top. Attach 4 lifting eyes and a 4 branch sling to the corner brackets. Lift straight up to remove. Exercise caution when removing the internal box to prevent striking the viewing window. It is located at the lower front side of the storage box. This side is labeled "front".

If further assistance is required contact the Wing-9 personnel in the CMR Building at 7-4653.

A.

4

19.4

A. CALCULATION FOR Platonium And URANIUM

B. calculations for Fission Products

15. 90 MEAN 4. 36 STD DEV

4. 115 00 TOTAL UCD 2, 619.00 4-

3.873 (()(**4235 G**) 2.465 00 **//**-

1.041 00 TOTHE RAG 6.626-01**4-**

8. 957-01**% 239 (9)** 5. 701-01 --

7. 95-014 Cs 137

7. 2663-014 Sr 96

7.2663-01**479**

5.82735-03**८ Кирь**

5.82735-03**4 RL106**

3. 23565-02456RS

1. 34355-026 725m

7. 4571-014 bullom

4.53945-02**4 R. M**7

1.48665-02**4 64/55**

TOTAL FISSION PRODUCT ALTIVITY

3.2581967 00**4**

2.0739011 00**4**-

B.

Section Control of the Section of th

- A. Calculations For Plutonium And Uranium
 - 1. Calculate the mean dose-rate value $(\overline{x}1)$ from the four measurements taken along a center-of-box axis at a center-of-box detector distance of 13 feet.
 - Calculate the standard deviation (one sigma) value on the mean value calculated in step 1. Call the standard deviation value Sa. Divide the standard deviation by the mean value and call this error term S1:

$$S1 = \frac{Sa}{X1}$$

3. Correct the mean value x1 for gamma attenuation through 0.25 inches of steel as follows:

$$\overline{x}2 = \overline{x}1 (1.45)$$

4. Correct x2 value for a worst-case distance (all material located in center-bottom or center-top of box) as follows

$$\overline{x}3 = \overline{x}2 \quad (1.05)$$

5. Convert the final, corrected dose-rate value $\overline{x}3$ to grams Pu as follows:

grams
$$Pu = \overline{x}3 (0.043)$$

6. Convert the final, corrected dose-rate value $\bar{x}3$ to grams 239 Pu as follows:

grams 239 Pu =
$$\bar{x}$$
3 (0.037)

7. Convert the final corrected dose-rate value \overline{x} 3 to grams U as follows:

grams
$$U = \overline{X}3$$
 (0.17)

8. Convert the final, corrected dose-rate $\overline{x}3$ to grams 235 U as follows:

grams 235 U =
$$\bar{x}$$
3 (0.16)

9. Calculate the relative overall measurement uncertainty as follows:

Relative Overall Uncertainty = $\sqrt{0.33 + (S1)^2}$

10. Multiply the Relative Overall Uncertainty value from step 9 times the gram Pu, 239 Pu, U, and 235 (steps 5, 6, 7, and 8) and report as the one sigma value for each element/isotope.

Justifications For Plutonium And Uranium

Point Source Model

A series of measurements were conducted to test the assumption that measurement of the dose rate of a 10' \times 5' \times 5' box using an uncollimated PIC-6 meter located 13 feet from the box centerline (10 feet from the front or rear face) and at the box horizontal axis, is reasonably represented by a point-source model.

The point-source model requires that the observed dose rate is inversely proportional to the square of the center-of-source to detector distance. To test compliance to this requirement, the box dose rate was measured at a 13 foot distance. The box was then rotated 900, three times, and measurements made on all four faces at the 13 foot distance. Without further box rotation, measurements were taken with one foot increases in the center-of-box to detector distance. At a final distance of 23 feet, the box was again rotated through 900 increments and measurements taken on each face.

The measurement data is presented in Table 1.

Table 1

Dose-Rate Measurements Box #14

PIC-6 Readings <u>mR/hr (net)*</u> 11.4	Center-of-box to <u>Detector Distance, feet</u> 13	Box <u>Orientation</u> back
10.4	13	left side
9.4	13	front
11.4	13	right side
9.6	14	right side
8.9	15	right side
7.4	16	right side
6.9	17	right side
6.15	18	right side
5.4	19	right side
5.15	20	right side
4.65	21	right side
3.9	22	right side
3.4	23	right side
3.2	23	back
3.2	23	l e ft side
3.2	23	front

^{*}Background dose-rate = 0.6 mR/hr.

The Table 1 data was analyzed two ways to test the point source (inverse distance squared) model.

Method A. Thirteen and 23 foot distance measurements with box rotation.

Mean values and one sigma uncertainties were calculated on readings taken at box orientations back, left side, front, and right side, both at the 13 and 23 foot distances. Results of these calculations are listed in Table 2

Table 2

Center-of-box	Mean dose-	One standard
Detector distance, feet	Rate, mR/hr	Deviation on Mean
13	10.65	0.96
23	3.25	0.10

To test the mean dose-rate value taken at 13 feet, the 23 foot mean dose-rate value is corrected for distance as follows:

3.25 mR/hr x
$$\frac{(23)^2}{(13)^2}$$
 = 10.17 mR/hr

This value compares with the observed 13 foot value as follows:

2. Attenuation Correction

Spectra taken with a Geruanium detector and Canberra-35 MCA showed a very strong 137 Cs spectra. If other peaks were present, they were not disenable above the 137 Cs gamma peaks plus Compton continuum.

The hot cell gloveboxes has a wall thickness of 0.125 inches (steel) and the boxes housing the gloveboxes was of 0.125 inch wall thickness (steel). Total wall thickness is 0.250 inches (0.635 cm).

Attenuation correction for the 662 Kev, 137/Cs gamma through 0.635 cm of iron is:

$$T = e^{-\mu\rho}x = e^{-(0.0738)(7.86)(0.635)}$$

$$T = 0.69$$

A correction factor of $\frac{1}{T} = 1.45$ is used.

3. Worst-Case Distance Correction

The center-of-box to detector distance assumes the source of the gamma signal is at the very center of the box volume. Since the box was rotated and measurements taken at the four box faces (sides, front, and back), the worst-case location of the gamma source would be at the center of the box top or bottom.

Distance from the detector to the box top or bottom center is 13.34 feet.

A worst-case bias correction for this distance effect is: $Correction = \frac{(13.34^{2})}{(13.0)^{2}} = 1.05$

4. Calibration Constant

Thirty-two cans of scrap representing the reactor fuel specimens handled in the hot cell gloveboxes, were measured for dose-rate with a PIC-6 instrument. Each of these cans had a know weight of fuel material. The attached table column F lists the dose-rates measured (at one meter) for the weight of scrap fuel listed in column I. The dose-rate were divided by the scrap fuel weight for each can and the mean value and one standard deviation for the mean determined. The values are: 67 mR/(hr)(gram), 38 mR/(hr)(gram) one sigma. The RSD is 0.57.

The fuel is of Mixed Oxide composition with the following makeup:

Pu:U ratio = 1:4
Weight fraction Pu = 0.18
Weight fraction 239 Pu = 0.155
Weight fraction = 0.70
Weight fraction 235 U = 0.65
Weight fraction 0 = 0.12

Dividing the weight fraction values for the elements and isotopes above by the nominal 67 mR/(hr)(g) and by 16 (adjusting

the 1 meter can measurement distance to the 4 meter box measurement distance), one obtains the following grams element or isotope per mR/hr constants listed below:

Calibration Constants

Isotope or Element	g Isotope or element per mR/hr
Pu	0.043
239 Pu	0.037
11	0.17
235 U	0.16

Note that the nominal 67 mR/(hr)(g) value is <u>not</u> corrected for attenuation. Attenuation correction for the cans of fuel scrap would be quite difficult because the can contents are very heterogeneous. By not performing attenuation corrections or the can dose-rates, we will <u>overestimate</u> the hot cell box fissile content.

5. Combined Error Terms

Two bias terms, the adjustment for worst-case distance and lack of attenuation correction on cans of fuel scrap, have been intensionally used to overstate the amount of fissile content of the hot-cell boxes. These terms will not be included in the combined error term.

Error terms to be included are for the mR/(hr)(g) factor for deriving calibration factors, the four measurements of the hot cell boxes, and the box attenuation correction. These terms discussed below:

a. Point Source Model.

The uncertainty on the point source model was estimated from the Table 3 data. The one standard deviation of 0.04 on the mean value of 0.99 is a relative error of 0.04.

- b. Calibration Factor
 The one standard deviation value on the mean 67
 mR/(hr)(g), derived from the 32 can measurements, is 38
 mR/(hr)(g). This translates to a relative error of
 0.57.
- c. Four Box Measurements
 This error term is the one standard deviation on the mean value of the four box face mR/hr measured values.
 Call this term S1.
- d. Attenuation Correction
 This correction has uncertainties in both the nominal attenuating steel thickness and in the mass attenuation coefficient. Assuming the thickness can vary by 10% and the coefficient has a 20% uncertainty, these error terms introduce relative uncertainties into the mass of element or isotope as follows:
 - i) Thickness relative error = 0.03
 - ii) Attenuation coefficient relative error = 0.07

These uncertainty terms are combined in quadrature as follows:

Overall Uncertainty =
$$\sqrt{(0.04)^2 + (0.57)^2 + (51)^2 + (0.03)^2 + (0.07)^2}$$

Overall Uncertainty = $\sqrt{0.33 + (51)^2}$

The four percent difference from perfect agreement indicates very good agreement with the point-source model.

Method B. Consistency of inverse-distance-squared correct measurements at increased distance.

Eleven mR/hr measurements were performed while increasing the center-of-box to detector distance from 13 to 23 feet in one foot increments. The box remained in the "right side" orientation. Each mR/hr measurement value was "corrected" to the 13 foot distance and the "corrected" values listed in table 3.

Table 3

14-23 Foot mR/hr Values Corrected to 13 feet

Center-of-Box	Net mR/hr	mR/hr corrected	13 ft value
	observed	to 13 ft distance	corrected
value) 14	9.6	11.1	1.03
15	8.9	11.8	0.97
16	7.4	11.2	1.02
17	6.9	11.8	0.97
18	6.15	11.8	0.97
19	5.4	11.5	0.99
20	5.15	12.2	0.93
21	4.65	12.1	0.94
22	3.9	11.2	1.02
23	3.4	10.6	1.07

Reducing the right-hand column data from Table 3 yields a mean value of 0.99 and a one sigma value of 0.04. All values fell within one sigma except the 23 foot and 20 foot values which were within two sigma and on opposite "sides" of the mean value. This information indicates that the point-source model is appropriate for the 13 foot measurement distance.

B. Calculations for Fission Products

Multiply the mean PIC-6 value (x1 from A.1) by 16 to estimate the point-source dose rate at one meter. Divide this value by 1000 to convert to Roentgans per hour at one meter (Rhm).

 $Rhm = (\bar{x}1)(16)/1000$

- 2. Divide the Rhm from B.1 by 0.32 Rhm per Ci to convert to curies Cs-137.
- 3. Using the Ci Cs-137 value from B.2, multiply by the factors below to estimate the remaining fission product activities:
 - Ci Sr-90 = (Ci Cs-137) (0.914) Ci Y-90 = (Ci Cs-137) (0.914) Ci Ru-106 = (Ci Cs-137) (0.00733) Ci Rh-106 = (Ci Cs-137) (0.00733) Ci Sb-125 = (Ci Cs-137) (0.0407) Ci Te-125m = (Ci Cs-137) (0.0169) Ci Ba-137m = (Ci Cs-137) (0.938) Ci Pm-147 = (Ci Cs-137) (0.0571) Ci Eu-155 = (Ci Cs-137) (0.0187)
- 4. Calculate the total fission product activity from the Cs-137 activity as follows:

Total Fission Product Activity = (ci Cs-137)/0.244

Justifications For Fission Products

- 1. High-resolution gamma spectroscopy measurements on the hot cell liners showed the peaks and Compton continuum of Cs-137. No other peaks were observed. This observation is reasonable as the irradiated fuel samples examined in these cells had been out-of-reactor greater than 10 years and as the irradiated fuel radiation reaching the PIC-6 instrument was attenuated by 0.25 inches of steel. An assumption was made that the radiation measured with the PIC-6 was due solely to Cs-137.
- 2. Appendix B of report LA-4400 was used to convert the observed dose rates (measured at 4 meters) were multiplied by 16 (distance correction) prior to dividing by 0.32 Rhm per Ci.

3. Attached tables (Fission Products from U-235) supplied by R. Henderson (HSE-1) were use to estimate the curies associated with fission products other than Cs-137. Fuel residues the alpha boxes are conservatively estimated at 10-years-since-irradiation hence the "Ratio-to-Cs-137", "10 Years" table data was used.

	A	В	С	D	E	F	G	Н	ī	J	K	L	М	N	0
1	STEEL	LOGBO		WT.	RADIATK	ON (R/hr)	ESTIMA	TED (g)	ASSAY	STD.	ASSAY	DRUM	CANISTER	?	STEEL CAN
2	CAN#	No.	PAGE	(Lbs.)	Contact	1 meter	Pu	U	WT. (g)	DEV.	REPORT	No.	No.	?	LOCATION
49	151	23744	48	29	33	1.5	0.1	96	15.6	3.1	4/12/90			FU	CE5E3
50	152	23744	48	41	15	0.3	0.1	145	3.0	0.6	4/12/90			FU	CE5C3
51	159	23744	49	33	300	5	3	6	11.2	2.6	1/11/91			FU	CE416
52	171	23744	50	44	280	2.7	2	8	6.4	1.6	1/11/91			FU	CE4B2-2
53	173	23744	51	38.5	900	6	2	0.4	6.3	1.8	1/11/91	<u> </u>		FU	CE4F4-2
54	351	23744	82	32	300	4	8	32	16.7	8.7	9/12/90			P	CE5A3-2
55	352	23744	82	27	100	1	6	24	22.5	8.7	9/12/90			PJ.	CE5H6-2
56	353	23744	82	30	150	2	7	30	18.7	8.7	9/12/90			FJ	CE5H2-2
57	354	23744	82	27	200	3	7	27	16.2	8.7	9/12/90	<u> </u>		FU	CE5G4-2
58	355	23744	83	31	40	1	8	34	21.0	8.7	9/12/90			PJ	CE5C3-2
59	356	23744	83	30	40	2	8	32	17.3	8.7	9/12/90			FU	CE5C5-2
60	357	23744	83	30	300	5	6	25	17.0	8.7	9/12/90	ļ		FU	CE5C4-2
61	358	23744	83	32	200	3	14	51	27.2	8.8	9/12/90	 		PJ	CE5B4-2
62	360	23744	84	34	65	1	7	30	23.5	8.7	9/13/90	ļ	 	FU	CE5F6-2
63	361	23744	84_	28	150	3	8	31	14.9	8.7	9/10/90	 	 	FU	CE5F5-2
64	437	23744	107	43	1	0.01	0.1	4	0.82	0.30	2/4/91	 		MS	CE4F9-3 CE7E9
65	123	23744	40	26	35	0.3	11	86	33	9	2/4/91			MS	CE7E9 CE7F9
66	124	23744	38	27	250	2.5	19	71	47	10	1/17/91	 		MS	CE4F8-2
67	125	23744	38	29	200	3	18	75	62	10	1/17/91			MS	CE4F8-2 CE4D4-2
68	126	23744	36	27	900	5.5	18	80	64	10	1/17/91	 		MS MS	CE4G3-2
69	127	23744	38	28	600	3	18	80	60	10	1/17/91	 	<u> </u>	S	CE4F1-3
70	128	23744	40	27	200	1.5	15	76	48	8.7	11/21/90			1 20	CE4C6-2
71	129	23744	37	26	130	3	19	70	24.3	9	1/17/91	'	<u> </u>	MS	CE4H8
72	130	23744	36	24	200	6	19	79	67	11	1/17/91	+		MS	CE4A8-2
73	131	23744	37	26.5	>1000	10.5	24	75	41	10	1/25/91	 	 	MS	CE719
74	132	23744	37	26	150	3	21	78 79	26.9	8.7	11/21/90			MS	CE4B7-2
75	133	23744	37	26	100	1.5	20	74	50	10	2/4/91	'	 	MS	CE7C9
76	134	23744	36	27	160	2.5	17	74	30.7	8.8	11/21/90	, 	 	MS	CE415
77	135	23744	36	27.5	135	3	20	78	46	10	1/17/91	1		MS	CE4E8-2
78	137	23744	38	28	220	2	34	62	63	11	1/28/91	1	†	MS	CE4D8-2
79	138	23744	40	28	120	4	16	81	56	10	1/17/91	1		MS	CE4G8-2
80	139	23744	38	26	250 375	2.9	20	80	47	10	1/28/91	1	1	MS	CE411
81	140	23744	36	28	300	3	18	80	54	10	1/25/91			MS	CE7G9
82	141	23744	40	29	150	2	16	52	51	10	1/17/91		1	MS	CE7D9
83		23744	39	26	120	2	18	78	36	9	11/21/90	_		MS	CE4C7-2
84	143	23744	39	27	110	2	19	72	40	10	1/17/91			MS	CE7H9
85	144	23744	39	27	200	3	14	68	63	10	1/28/91			MS	CE4A7-2
87		23744	39	29	130	4	18	65	27.0	9.1	4/12/90			MS	CE5D3
88		23744		29	120	3.5	19	81	53.4	10.6	4/12/90			MS	
89		23744	37	29	175	1.5	25	66	22.7	9.0	4/12/90			MS	
90		23744		28	110	5	12	87	76	11	1/17/91			MS	
91		23744		30	600	7	19	80	76	11	1/17/91		<u> </u>	MS	
92		23744		32	500	5	17	80	76	12	1/25/91			MS	
93		23744		30	80	1.5	27	63	38	9	1/11/91			MS	CE4G1-3
94		23744	+	29.5	5	1.3	6	91	41	9	1/11/91			MS	
9 5		23744	_	29	60	1.5	18	70	36	9	1/11/91		 	MS	
96		23744		31	70	1.5	25	52	34	10	1/28/91	_		MS	
97		23744		28	600	10	59	38	17.4	3.1	10/3/90			파	
98	_	23744		27	500	9	84	3_	16.7	2.9	10/3/90			TH	
9 9		23744		26	500	10	84	5	16.7	2.9	11/21/9			H	
10				26	500	9	85	4	17.2	3.0	10/3/90			TH	
10		23744		27	400	8	88	24	11.1	1.9	10/1/90			TH	
10		23744		28	500	10	87	23	10.7	1.8	10/1/90			TH	
10		23744		29	550	8	86	5	18.7	3.4	11/21/9			쁘	
10				26	350	5.5	45	93	14.0	2.5	10/3/90)		TH	CE4E3

Prompt Fission Products from U-235 Relative Curies

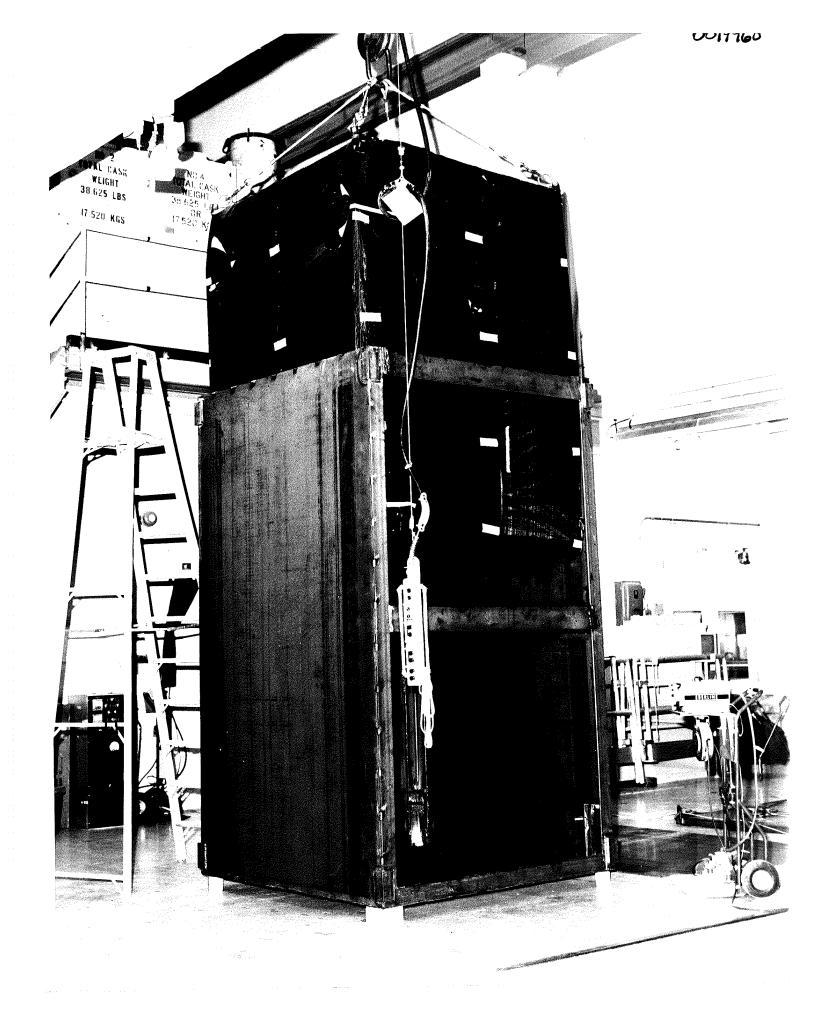
7 Years	10 Years	20 Years
9.74E-04	- ·	7.11E-04
9.74E-04		7.11E-04
5.76E-05	-	7.35E-09
5.76E-05		7.35E-09
8.75E-05	4.05E-05	3.11E-06
3.62E-05	1.68E-05	1.29E-06
1.06E-03	9.95E-04	7.87E-04
9.95E-04		7.38E-04
8.11E-05		2.62E-06
2.49E-05		1.20E-05
4.35E-03	3.89E-03	2.97E-03
io to Cs-137		
	9.74E-04 9.74E-04 5.76E-05 5.76E-05 8.75E-05 3.62E-05 1.06E-03 9.95E-04 8.11E-05 2.49E-05 4.35E-03	9.74E-04 9.09E-04 9.09E-04 9.09E-04 5.76E-05 7.29E-06 8.75E-05 3.62E-05 1.68E-05 1.68E-05 1.06E-03 9.95E-04 9.95E-04 8.11E-05 2.49E-05 4.35E-03 3.89E-03

Nuclide Sr-90	7 Years 91.89%	10 Years	20 Years
Y-90	91.89%	91.36% 91.36%	90.34% 90.34%
Ru-106 Rh-106	5.43% 5.43%	0.73% 0.73%	0.00% 0.00%
Sb-125 Te-125m	8.25% 3.42%	4.07% 1.69%	0.40%
Cs-137 Ba-137m	100.00% 93.87%	100.00%	0.16%
Pm-147 Eu-155	7.65%	93.77% 5.71%	93.77% 0.33%
54-T00	2.35	1.87%	1.52%

Ratio to total listed activity (>95%)

Nuclide	7	Years	10 Years	20 Years
Sr-90		22.40%	23.35%	23.97%
Y-90		22.40%	23.35%	
Ru-106				23.97%
		1.32%	0.19%	0.00%
Rh-106		1.324	0.19%	0.00%
Sb-125		2.01%	1.04%	0.10%
Te-125m		0.83%	0.43%	
Cs-137			·	0.04%
		24.38%	25.56%	26.53%
Ba-137m		22.88%	23.96%	24.88%
Pm-147		1.87%	1.46%	
Eu-155		0.57%		0.09%
		0.5/4	0.48%	0.40%
Nuclide				
Sr-90	No Gammas			
Y-90	No Gammas			

Sr-90	No Gammas		
Y-90	No Cammas		
Ru-106	.511 Mev	20 %	•
Rh-106	.622 MeV	10 %	
Sb-125	.430 MeV	30 \$	
Te-125m	No Gammas	-	
Cs-137	No Gammas		
Ba-137m	.661 MeV	90 &	
Pm-147	.474 MeV	36 %	
Eu-155	.086 MeV	30 %	
	.105 MeV	20 %	



RADIOACTIVE SOLID WASTE DISPOSAL RECORD

Page 10P2

Los Alamos National Los Alamos, New Me		TF: Read inst	tructions on back	carefully befor	e comple	ting this form.		
1. Form Number				,	•		HSE-7 Waste	Management
<i>¥</i> (e.						Ext. 6095,	MS J592
s 9 1 1 932 2		r				т		
2. Date	3. Retrievable	4. Origin of		T				5. Waste Code
MMDDYY	Serial Number	Group	TA TA	Building		Wing	Program Code	
082391	8/19/9/60	MST	5 3		29	9	X 7 7 A	A 4 /
6. Waste Description								
CECC 2	5 T A 1 N L E	555	TELL	ALF	' A	B 0 x	PACI	t E D
7. Numbers of Waste Page	ckages		8. Gross Volur	те		9. Pad	ckage Radiation at	
Plastic Board	Drums Wooden	Crates		$M = meter^3$ $F = foot^3$		Surfac	ce 1 M	eter
Bags Boxes	No. Gal. No. Vo	lume-ft ³	Amount	G = gallon		(mr/h	r) (mi	r/hr)
			3 6 000 1			2	000	120
10. Gross Weight	11 Additional	Description of	f Packaging and	Packaging Ma	aterials			
/K = kilo			mercet -					
Amount $P = pou$	/				1 1	$ \omega P $	OE INA	5 3 8
	1/2/ 5	TEE	C 60	X		00 7	K P	
3 41 7								
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	1.	(C = curie) M = gram		1 .	I A	= analysis 1= measurem	ent Account	Project
Nuclide	Amount ±	:	Amount			= estimate	7.0000	Code
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P 4 55	140 00 E+	- 0 M	6+6 1	00 E -	II A			
	- D. K. A			E	,			
C s 1 3 7	7 97 9 0 E	1 6		.	E			
5 R 90	7 6 2 6 6 E -	110	•	E	E			
Y 9 0	7 + 2 6 6 E -	110	•	E	LE			
R4106	5 8 2 7 E	3 C		E				
			APPROVAL	e				
Waste Generator (Print Nam	ne Here)	HSE-1/-10/-	11 Area Represen	tative (Print Name	e Here)	Additio	onal Signatures (Option	onal)
TobiAs J	Romelo	Kou	NOLL	1Aus	7	en	Propoli	
Signature certifies that the	waste is as represented here and	3 Signature c	ertifies that waste p	ackage or shipme	ent is safe t	to C:•		
that ALL applicable accepts criteria have been met(Sign	ance and disposal/storage ature)	handle and	Pransport(Signature	ΩI				
Johns /	lomer-	1	1. (ll	WH				
				······································	************	7 45	5. Shaft Surface Do	260
13. Date Disposed	14. Disposal/Stora		D	1	_ Tn=	1 -	mr/hr	,36
M M D D Y			Post(s)	Laye	r Pos.	1		
1/2/0/5/9		3						
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	J. CATANACH	Ind dianassi/s	torbae requirem	inte wara met	AC	Date	Date	Date
Signature certifies that a	al waste receiving, handling,	Luce -	Morage requirem	AND WOLD HIGE.	12/5	12/		1
Form Number HS 10-2A (12)		- COO CE -						

Form Number HS 10-2A (12/89)

RADIOACTIVE SOLID WASTE DISPOSAL RECORD

Los	Alamos	Natio	nal	Lab	oratory
Los	Alamos:	: New	Me	xico	87545

Page 1 of Z

Los Alamos; New M	exico 875	545	NOT	E. Hea	ad instr	uctions o	in back	caretui	iy bei	ore co	mpier	ing mis	101111.	,			
1. Form Number														HS	SE-7 Waste		- 1
s 9 1 P32R														<u> </u>	Ext. 6095	. MS	J592
2. Date	3. Retriev			4. Ori	gin of	Waste											Waste
MMDDYY	Serial P	lumber		Grou	р		TA	Build	ling			Wing		Progra	m Code	-	Code
082391	0/19	9 9 6	0	M 5	7	5	3			2	9		9	X 7	7 A	A	4 /
6. Waste Description																	
CECL 2	STA	1/2/6	- E S	- \$	S	7 E	CL	A	6	PA	A	B	0 7	()	PAC	KE	- D
7. Numbers of Waste Pa						8. Gross							9. Pa	ckage F	ladiation a	t	
Card- Plastic Board	Drums		oden Cr				11	M = me F_ = foc	ot ³		-		Surfa			leter	
Bags Boxes	No. Ga	al. No.	Volur	ne-ft ³		Amou	nt (G = gal	lon /				(mr/I	nr)	(m	ir/hr)	
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341 T																	
12. Radionuclide Conte	nt					···	······································				-				SS Mater	rials V	Vrite-Off
				T.,							1			nined By:	:	\top	
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4 3 8	4.1		E + 0	D /M	•	2.4	.		E 1	- 0	B						
P455	10		E + 1	M		6.4			E	- 1	A						
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SR 90	762	1616	E -	1 6	-3	•	1		Е		E						
1/10	7.2	1 / 1 /	F=	1 0		1	1		E	1							
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R4106	5 . 8	27	E -	3 2		•			E		E					L	
						APPRO	OVALS	3									
Waste Generator (Print Nan	ne Here)			HSE-		1 Area Re			int Na	me Here	e)	T.	Additi	onal Sign	natures (Opti	onal)	
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Signature certifies that the that ALL applicable accept criteria have been met(Sign	waste is as rance and dis	epresented h posal/storag	ere and e			rtifies that ransport(S		ckage c	r shipi	nerlt is	sate to						
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HSE-7 Waste Managen			Print Nam	e Here	e)		-			1	eivec	j L	.ogbo	ok	Comput	er \	Verified
Signature certifies that			Alina In	d dispe	sal/st	orage rec	uiremei	nts wer	e met	Dat		 r	AC Date	-	Date		Date
(Signature)	The master 14	July, hal	, J.	0.60	د ۲		13.1011101			17	1		12/	<u></u>	135:	را ح	

Alamos Alamos National Laboratory Alamos New Mexico 87545

RADIOACTIVE SOLID WASTE DISPOSAL RECORD

NOTE: Read instructions on back carefully before completing this form.

s Alamos, New M	exico 8/545	O7 E. Head mond	0110110 011 011	,		HSE-7 Wa	aste Managament
Form Number 322	Continuation					Ext. 6	095, MS J592
9 1 7		4. Origin of W	/aste				5. Waste
. Date	3. Retrievable Serial Number	Group		Building	Wing	Program Code	Code
MDDYY		1 1 1		1 1 1	-		
Waste Description						,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
						1 1 1 1 1	
. Numbers of Waste P	ackages	8	3. Gross Volume		9. 6	Package Radiation	on at
Card- Plastic Board	Drums Wooder	n Crates	1 (F	= meter ³		face r/hr)	1 Meter (mr/hr)
Bags Boxes	No. Gal. No. V	/olume-ft ³	Amount \(\(\mathbb{G} \)	= gallon /			,
		1 1 1					
• •	1						
0. Gross Weight		al Description of I	Packaging and Pa	ckaging Mater	rials		
$ \begin{array}{ccc} K = KI \\ P = DI \\ T = 10 \end{array} $	ound)		1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	
The state of the s							
2. Radionuclide Con	tent						Materials Write-Of
		/C = curie \	Error on		Amount Dete	s \	Project
Nuclide	Amount	士 (C = curie)	Amount	±	M= measur E= estimat		count Code
RIL 1 10 10	5.8 2 7 E	- 3 c	 	E	ε		
			1 1	E	E		
5 6 1 2 5	-3 2 3 6 E	- 2 C	-				
TE 12	7+3 4 4 E	- 2 C	•	E	E	-	
B A 1 3		-11 c =	•	E	Ε		
O A I J					_		
Pm 14	7 4 5 3 9 E	- 2 c	• —	E	<u> </u>		
E 4 1 5	5 1.4 18 17 E	- 2 C	•	E	$ \mathcal{E} $		
			ADDDOVALC				
Waste Generator (Print I	Name Here)	HSE-1/-10/-	APPROVALS 11 Area Representa	tive (Print Name F	Here) Ac	Iditional Signature	s (Optional)
Signature certifies that	the waste is as represented here	and Signature of	ertifies that waste pa- transpor i(Signature)	ckage or shipmen	t is safe to		
criteria have been mets	ceptance and disposal/storage Signature)	Handio and					
				***************************************		Te ob-40-4	age Dess
13. Date Disposed	14. Disposal/St			T		15. Shaft Surf	ace DUSE
	YY	Shaft Pit	Post(s)	Layer	Pos.		
11210131	911 61 31			1 1			<u> </u>
HSE-7 Waste Manag	gement Representative (Print J. CATANACH	nt Name Here)			1	ogbook C	omputer Verified
Signature certifies the	nat all waste eceiving, handi	ing_and disposa//s	storage requiremen	nts were met.			ate Date
(Signature)	X- \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \				12/5 /	3/5	734
Form Number HS 10-2A	. (12/89)						

Los Alamos

Los Alamos National Laboratory Los Alamos, New Mexico 87545

RSWD	Retrievable				
Form Number	Serial Number				

s 9 1 0 3 2 2 0 1 9 9 6 0

Date

NONCERTIFIED TRU WASTE SUPPLEMENTAL DATA SHEET

I. Waste Generator's Package Information Organic Material Weight (lb.) * 0 E + Organic Material Volume (%) 0 Internal Shielding Nonradioactive Hazardous Materials Thickness (in.) Type X None Name **EPA Code** Quantity (g) Lead E None. F ☐ Steel Е F ☐ Concrete F F ☐ Other Ε Internal Packaging **Additional Information** Plastic bags Stanless steel Number_ packed Thickness ☐ 90-mil HDPE Liner Blocking ☐ Other 00538 herence The waste described herein was prepared, packaged, and documented such that it meets all of the applicable requirements of AR 10-5 of the Los Alamos Health and Safety Manual. The data are correct and complete to the best of my knowledge. **Printed Name** Signature II. GENERATOR SITE HEALTH PHYSICS INFORMATION Gamma Dose rate (mrem/h) Survey Meter Model Property No. 002691 Neutron Dose Rate (mrem/h) Survey Meter Model Property No. The data in this section were collected as prescribed in approved procedures. Total Dose Rate (mrem/h) Printed Name Alpha contamination (dpm/100cm²) 0 Signature Beta-Gamma Cont. (dpm/100cm²) III. HSE-7 AUTHORIZATION The data package for this waste has been reviewed by HSE-7. The generator is authorized to arrange transportation to TA-54. **Printed Name** Signature IV. RECEIVING SITE HEALTH PHYSICS INFORMATION Gamma Dose rate (mrem/h) Survey Meter Model Property No. Ε Neutron Dose Rate (mrem/h) Survey Meter Model Property No. Ε The data in this section were collected as prescribed in approved procedures. Total Dose Rate (mrem/h)

Printed Name

Signature

Ε

Ε

4

HS Form Number 10-5B (11/88)

Alpha contamination (dpm/100cm²)

Beta-Gamma Cont. (dpm/100cm²)

LOS Alamos Les Alamos National Laboratory Los Alamos, New Mexico 87545

WASTE PROFILE REQUEST

HSE-8 USE	ONLY
Reference Number	
00538	×

Complete both sides of this form using a black or blue pen. Inadequate information will result in processing delays. Send completed form to: <u>ATTN: WPRF, MS K490</u>

Division/Group					*******		
M57-5	Telephone	Mail Stop	1-	Technical Area	Building		Room
P1131-3	667-4653	6-70	72	TA-3	Sm-	29	W9-9

⋉ Knowledge of Pro	cess		П	Chemical/Physic	al Anaivse	s (Specify	Below)
MSDS Attached				Request For Analysi			Attached
							Attached
Choose one or more o	f the items below which	best descr	ibes your	waste:			
☐ Flammable	C Bootinida		1_1				
	Pesticide	Photogr	•	Spent Coo		Plastics	
Combustible	Beryllium	Sanitary		Aerosol Ca	ans	Filter Me	dia
High Explosive	Asbestos	Radioch	emistry	Motor Oil		☐ Vacuum	Filter Sludge
Oxidizer	Solvent	Paint W	aste	Pump Oil		Cement	Paste
☐ Pyrophoric	☐ Waste Rags	Laborate	ory Trash	Capacitor	Oil	☐ Non-Salv	ageable
Cyanide Cyanide	Glass	Metallur	gic	UST Reme	diation	Non-Rec	
Heavy Metal	Plating Solution	Scrap N	letal	Soils		Building	
Corrosive	Etchant		/Biological	Environme	ntel	Firing Sit	
						Clauma au	e Debns
Additional Description	(Optional)	s		•			
aip	HA CONTAI	NMB	NT	boxEc			
	$\frac{1}{1}$			- DU PUS	· · · · · · · · · · · · · · · · · · ·		
1							
					~	·····	
General Description Of	Waste (check at least or	ne block fo	r each co	olumn):			
				·			
FORM	FLASH POINT (°F)	pН		REACTIVITY		PCBs	
				11221011111		1 003	
Solid	Less Than 100	2.0 or L	0SS	Unstable		< 50 ppr	n
Cemented Sludge	100 to 139	2.1 to 1	2.4	Reacts Wi	th Water	□ 50-500 p	mac
Semi-Solid/Sludge	140 to 200	12.5 or		Cyanides		> 500 pp	
Absorbed Liquid	Greater Than 200	Not App		Sulfides		No PCBs	
Liquid	None	A				No reas	
Gas	A CONTRACTOR OF THE CONTRACTOR			Shock Sen			
				 .	B Explosive		
Multi-Layer				Non-React	ive		
Suspended Solids				, "			
Powder or Ash							
Indiana Varianto Dadi		1 [
indicate known Rad	oactivity Of Your Waste:	List	known Ha	idioistopes:			
☐ Not Radioactive (Go Te	o Next Section)	Dete	rmined By	Assay	Determi	ned By Estim	ate
			. 000	<u></u>	-		
<2.0 nC/g	⊠ Alpha	Radios	sotope 1. 2	L^{35} μ	Activity/Uni	t of Measure	NA
> 2.0 nC/g	⊠ Beta	Radios	otope 2. Z	239 PU	Activity/Uni	t of Measure	i
	Gamma				•		
> 100.0 nC/g	Tritium	1 1	otope 3		Activity/Uni	t of Measure	
AL TOOLS HONG	THOOM	Radios	otope 4. y	MAP	Activity/Uni	t of Measure	(P
The second secon		J [******************************		
GENERATOR CERTIFIC	ATION						
form is correct. Lunderates	of the waste, and/or chemical/p	nysical analy	sis, I certify	that the information	n provided re	garding the v	vaste specified on this
false information, including a	d that this information will be n the possibility of fines and impr	isonment for	e to regulati knowina vi	ory agencies and tha plations	ic there are s	igniticant per	naities for submitting
and the second s			AND THE VI	\			
Print Generator's Name (Las	t, First Mi)		Z Number	Generator	s Signature		Date
1				\ \ \ \	1		
LEDBETTER	(AMES M	1.	0770	67	ledhe	the	6.27-9
	linator is the custodian of your	Weste		Waste Coordinators	Name / sct	Eiret Mil	Mail Stan
management documentation	, provide the name and mail sto	op of this	ant Group	waste Coordinators	1401110 (285),	CHO(IVII)	Mail Stop
person (optional).			Cno	CIA DA	10.11	•	(-72R
	PRINCIPAL CONTRACTOR C		UMIL	WIH DE	myLL	<i>.</i>	
Form 1346 (4/91)		p.	ide 1 of 2		•	Como	lata Rayarca Sida

Heavy Metals (indi	icate wholl	or the fell	1.				***************************************
Heavy Metals (ind	None	ier the following	heavy metals ex				
Arsenic	2	< 5.0 ppm	□ > E ^	KOP		TCLP Other	
Barium 🕝	Ē	☐ < 100.0 ppm	☐ ≥ 5.0 ppm	Z.	∐}	-	*
Cadmium	吊	☐ < 1.0 ppm	☐ ≥ 100.0 ppm	9888888	<u></u>	-	**
Chromium	##	☐ < 5.0 ppm	☐ <u>≥</u> 1.0 ppm	Ш		- □	
Lead	- 13		≥ 5.0 ppm	Щ		•	
Mercury	#	< 5.0 ppm	☐ ≥ 5.0 ppm	Ψ		•	
Nickel		☐ <0.2 ppm	≥ 0.2 ppm	Ψ		-	
Selenium	\mathbb{H}	(134.0 ppm	☐ ≥ 134.0 ppm	Щ		•O O	
Silver	#	< 1.0 ppm	≥ 1.0 ppm	Ф	□>	•	
Thallium	H	☐ < 5.0 ppm	≥ 5.0 ppm			•	
	do libelia e e e	☐ <130.0 ppm		TA)		· □	
Organic Compound	enoM	if the following	organic compou	nds exist ir	n your waste, a	t the posted	concentration):
Benzene		< 0.5 ppm	□ > 0 E	KOP	Analysis 1	CLP Other	•
Carbon Tetrachlorid		<0.5 ppm	☐ ≥ 0.5 ppm	区	<u></u>	-	
Chlorobenzene	° H		☐ ≥ 0.5 ppm	里	□>	-0 0	
Chloroform	#	☐ < 100.0 ppm	☐ ≥ 100.0 ppm	Ф	$\square {\longrightarrow}$	-0 0	
	• 1000	☐ < 6.0 ppm		Ф	$\square{\longrightarrow}$	-0	
Cresol	N-Special Control	☐ < 200.0 ppm		Ф		-a	
1,4-Dichlorobenzen	• П	☐ < 7.5 ppm		中		-O	
1,2-Dichloroethane	<u> </u>	< 0.5 ppm		ф		ā H	
1,1-Dichloroethylen	• 🗓	☐ < 0.7 ppm		3 8888888888888 8			
2,4-Dinitrotoluene	P	< 0.13 ppm		由	$\overline{\Box} \longrightarrow$.a a	
Hexachlorobenzene		☐ < 0.13 ppm		. (1)	\Box	.H H	
Hexachlorobutadien	• 🗇	< 0.5 ppm		而	7	.H H	
Hexachloroethane	₫	☐ < 3.0 ppm		币	<u> </u>	.H H	
Methyl Ethyl Ketone	· ф	< 200.0 ppm	☐ ≥ 200.0 ppm	币	<u> </u>	.닭 片	
Nitrobenzene	山	< 2.0 ppm	≥ 2.0 ppm	吊	<u> </u>	.H H	
Pentachlorophenol	ф	< 100.0 ppm	≥ 100.0 ppm	吊		H H	
Pyridine	币	< 5.0 ppm	☐ ≥ 5.0 ppm	#		'님 님	
Tetrachloroethylene	币	☐ < 0.7 ppm	> 0.7 ppm	#		·H H	
Trichloroethylene	吊	< 0.5 ppm	☐ ≥ 0.5 ppm	X		·닠 닐	
2,4,5-Trichlorophen	a H	< 400.0 ppm	☐ ≥ 400.0 ppm	出		'닠 ᆜ	
2,4,6-Trichlorophen	. H	☐ < 2.0 ppm		4	<u> </u>	· <u> </u>	
Vinyl Chloride		< 0.2 ppm	 ≥ 2.0 ppm ≥ 0.2 ppm				
CHECK ONE	•		· · · · · · · · · · · · · · · · · · ·	uiu			
				1			
Additional hazard			7	There are no	o additional hazard	ous constituents	in this waste.
Com	pound Name		Concentration '				Concentration
1.	and the first production of the second section of the section of the second section of the section o	enteronication of the second o	PRANTO, P. S. SAN, SENSON RESTAURANT AND AND ANY SENSON SENSON SENSON SENSON SENSON SENSON SENSON SENSON SENSON	5		филотом по том помента в помент Помента в помента в	
2.	***************************************	PROVIDENCE OF THE PROVIDE O					
2							
	******************	M - MERCAN STATEMENT AND					
4.				8.		местрания сороставления оператору в проделения оператору в предоставления оператору в предоставления оператору	
With the latest and t	HS	E-8/HSE-7 U	SE ONLY (Do I				Managara an managara pangangkan na ani apada sa karangan ya na masa na sa
VASTE CLASSIFICATION	NC		Pionife dell'ament de la company de la compa		ekanorakan ekanarakan eranga eranga bera	***************	***
Non-Radioactive, I	Non-Hazardou	S	Radioacti	iva	Г	Hazardous or f	Aire
Solid Waste				Level Radioac			
☐ Non-Regulated	I Chemical Wa	ste		suranic Waste		Hazardous	
Sanitary Wast				ial Nuclear Ma		Mixed Low	
Other Non-Dis		A		idi Nuciear ivi	stenai	Mixed Iran	nsuranic Waste
							•
Hazardous or Mix /aste Code 1 Wa	ed Waste (Odification: Waste Code 3	Waste Code 4	Waste	Code 5 Was	te Code 6	Waste Code 7
			7.22.2	770310	yvas	10 0000	Trasta Code /
SE-8 Reviewer's Signa		**************************************		ate / /o	Cost Center/Pro	gramCode For H	l SE Analysis Backcharg
Hom	Esc			7/1/9/	•	_	,
		********************************	Page 2 o	10	****		



Appendix D

TRU Waste Storage Information, Container S912719 Stored in Shaft 304 This page intentionally left blank.



TRU WASTE STORAGE RECORD



S912719

1. Generator's P	Pre-Use Visual Inspe	ection												
Purchase Order #										Inspe	cted I	tems		
	been visually inspected a be free of damage that w						☐ F	Ring, Bolt	, and Nut		Chim	ne		Dents
packaging.	be free of damage that w	ould make	n unsulabl	0 101 1	NO Wasie			id and G	asket		Gou	ges	□ F	Paint
Printed Name				Signa	ture	•			Sig. Da	ite		0	Oper. Da	te
2 Generator's F	Package Information	1												
Group	Technical Area	Build	ing		Cost Cent	er		Progra	am Code	C	ost Ac	count	t Wo	rk Package
LTP-PTS	54		000000											
Additional Info	rmation				☐ DP ☐]	Nor	n-DP I	f Non-DI	⊃ was	te, atta	ach D	OE app	roval doc.
								F	Radionu	clide	Conte	ent		
														C= Curie
					Nuclide Am-241		ļ		nount BE-002			ertaiı	nty +000	M = Gram C
Container		Liner			Cs-137		_		E-002				+000	С
Steel Drum (☑ Nor					_							
☐ Pipe Overpa		+==	mil liner		Pu-238				E-003				+000	С
	(85 gal Overpack)		mil liner		Pu-239		_		E-002				+000	С
=	Standard Waste Box			_	Pu-240		_		E-002				+000	С
Standard Waste Box Overpack Internal Shielding			ng	Pu-241				'E-001				+000	С	
RH Canister				Pu-242				E-006				+000	С	
Other (Call TWCO) Type Thickness			Ru-106		i	3.903	BE-003		0.0	00E-	+000	С		
Filter Serial No	ilter Serial No.								Hazardo	us M	ateria	ls		
02							Name	•			EP	A Code	Qty (g)	
Waste Profile No	umber 5339	93 (WS	ID 370	17)										
Gross Weight (It	o.)		5.60E+0	003										
Net Weight (lb.)			4.00E+0	003										
Shipping Catego	ory													
LANL Waste Str	eam ID		TA-03-	-27										
TRUCON Code														
Date Closed (MI					Accumula									
The data in this se Printed Name	ection were collected, a	nd waste	described h	erein	was package Signature	ed	and I	labeled a	ccording	to app	roved p	roced Date		
Fillited Name					Signature							Date	•	
3. Generator Site	e Health Physics In	formatio	n											
	ate (mrem/h) (contac				Survey Dat	е	Sui	rvey Mete	er Model	Prope	erty Nu	mber	Calibra	tion Void Date
	ate (mrem/h) (contac				Survey Dat	е	Sui	rvey Mete	er Model	Prope	erty Nu	mber	Calibra	tion Void Date
	e (mrem/h) (contact)	,								<u> </u>				
	e (mrem/h) (1 meter)				- -						,.			
Total Dose Nate	(menvii) (i metel)				The data in Printed Nar			ection wei	re collecte	ed acco	ording	to app	roved pr	ocedures.
Alpha Contamin	ation (dpm/100cm2)					116	•						Dale	
Beta-Gamma Co	ont (dpm/100 cm2)				Signature									



TRU WASTE STORAGE RECORD

Printed Name



Date:

4. TRU Waste Management Review/Authorization

The data package for this waste has been reviewed. Basedon the information provided, this waste meets the WAC requirements for					Name		Dat	Date:				
storage at TA-54.		·		Signatur	е							
5. Preload Visual Ir	spection			-								
This waste package was according to approved labeling requirements	d procedures. It mee	ets WAC pack	aging and	Printed Name Date:								
defects. 6. Receiving Site H	ealth Physics Inf	formation										
Gamma Dose Rate	<u> </u>			Survey D	Date	ate Survey Meter Model		operty Numbe	r Calibration Void Date			
Neutron Dose Rate				Survey D	Date	Survey Meter Model Property Nu		operty Numbe	r Calibration Void Date			
		,,,										
	Total Dose Rate (mrem/h) (contact)				_							
Total Dose Rate (mrem/h) (1 meter)				Printed N		is section were col	ected a	according to ap	proved procedures. Date			
Alpha Contamination (dpm/100cm2)				Signature								
Beta-Gamma Cont (dpm/100 cm2)				Signatur								
7. Storage Site Info	rmation	T										
Received by (Initials)		Date Receiv	/ed			0	riginal	Storage Da	ta			
This waste package wand in good condition.					Building Number Layer Column Number Date S				Row Number cked (MM/DD/YY)			
procedures. Printed Name			Date:						Date:			
			Date.		Printed Name				Date.			
Signature					Sigr	nature						
8. Waste Acceptan	ce Office											
Intials/Date				V	/E D	escription						
NCR Number	Intials/Date					NCR Descri	otion					



TRU WASTE STORAGE RECORD



9. Continuation Sheet for Radionuclide Content (from Page 1, Section 2)

Radionuclide Content - Continued							
Nuclide Sr-90	Amount	Uncertainty	C= Curie M = Gram				
U-234	4.867E-001 1.804E-004	0.000E+000 0.000E+000	C				
U-235	5.634E-006	0.000E+000	С				
U-236 U-238	7.429E-007 5.208E-008	0.000E+000 0.000E+000	C				
Y-90	4.867E-001	0.000E+000	С				
	ı	ı	1				

10. Continuation Sheet for Hazardous Materials (from Page 1, Section 2)

Hazardous Materials						
Name	EPA Code	Qty (g)				
No Additional Hazardous Materials						



S912719 T-TTRU-TEMP

Status:

WS ID: 37017 C ID: 766494 Opt ID: B19455 ACTIVE

ACTIVE

SC: Shield cask

04-Dec-1991

Remotely handled canister

04-Dec-1991 12:00 am

NO

GENERAL INFORMATION

Decommissioned:

Container Subtype:

Accum Start Date:

Container Type:

Origin Date:

Closed Date:

Container ID: 766494 **Labeled ID:** S912719

Optional ID: B19455

Chemical Barcode:

Physical State: SOLID
Waste Stream ID: 37017

Work Path: T-TTRU-TEMP

Quantity (Univ):

Compactible:

Discard Matrix:

TID(s):

Gen Contact:

Insert By:

Waste Desc:

WCATS APPLICATION (000000)

GENERATED AT 03-00029

WEIGHTS AND VOLUMES

Container Volume: 10.20 CM Gross Weight: 5600.92 lb

Waste Volume: NOT SPECIFIED Tare Weight: 1600.00 lb

Net Weight: 4000.92 lb

LOCATION

Pickup (Origin): LANL: 03-CMR: GEN-AREAS

Current: LANL: 54-G-DISP: SHAFT304



CONTAINER PROFILE S912719 T-TTRU-TEMP

WS ID: 37017 C ID: 766494 Opt ID: B19455 ACTIVE

PAYLOAD INFORMATION

Container Procurement

P.O. Number: Year of Manuf:

Lot No.: Serial No:

Solution Package: 53: SP BG - Hot Cell Liners

TRUCON Code:

Shipping Category:

CCP AK Report:

WIPP Waste Stream: TA-03-27: COMBINED COMBUSTIBLE AND NONCOMBUSTIBLE

Matrix Code:

Defense Waste: Equiv. Comb. Matrix:

Adeq. Ventilation: Compliant Metal Cont.: YES

Overpack (1 to 1): NO Retrievable: BIR WS Code: LA-RM14

Content Code:

				COS	ST CODES		
Cost Center	Prog Code	Cost Account	Work Package	Percent Allocation	Cost Center Status	Cost Code Status	Recharge Mode
	X77A			100.00			SELECTION LIST

		EPA CODES
System	Hazardous	
Code	Waste No.	Waste Description & Treatment Subcategory



CONTAINER PROFILE \$912719 T-TTRU-TEMP

WS ID: 37017 C ID: 766494 Opt ID: B19455 ACTIVE

RADIONUCLIDES								
Nuclide	Amount	Unit	Uncert	MT Derived (Y/N)	Activated (Y/N)	(Y/N)	Normal Form (Y/N)	Measurement Code/Comment
Status: Activ	ve, Assay Page:	339626, 1	Date: 12/04/199	1, Deriv	vation: Ge	enerato	or Ente	red Results (e.g., Offsite Assay)
38	2.80E+000	g	0.00E+000	N				NONE
55	7.00E-001	g	0.00E+000	N				NONE
Am-241	2.16E-002	Ci	0.00E+000	Y			Y	
Cs-137	5.32E-001	Ci	0.00E+000	N			Y	
Pu-238	7.20E-003	Ci	0.00E+000	Y			Y	
Pu-239	3.64E-002	Ci	0.00E+000	Y			Y	
Pu-240	2.34E-002	Ci	0.00E+000	Y			Y	
Pu-241	7.46E-001	Ci	0.00E+000	Y			Y	
Pu-242	8.39E-006	Ci	0.00E+000	Y			Y	
Ru-106	3.90E-003	Ci	0.00E+000	N			Y	
Sr-90	4.87E-001	Ci	0.00E+000	N			Y	
U-234	1.80E-004	Ci	0.00E+000	Y			Y	
U-235	5.63E-006	Ci	0.00E+000	Y			Y	
U-236	7.43E-007	Ci	0.00E+000	Y			Y	
U-238	5.21E-008	Ci	0.00E+000	Y			Y	
Y-90	4.87E-001	Ci	0.00E+000	N			Y	



S912719 T-TTRU-TEMP

WS ID: 37017 C ID: 766494 Opt ID: B19455 ACTIVE

RAD CALCULATIONS

Total Activity (nCi/g): 1.29183E+03 DOTFissile Mat (g): 3.20012E+00

Alpha (nCi/g): 4.89884E+01 Transport Index:

TRU Alpha (nCi/g): 4.88754E+01 NRC Class: C

Pu-239 FGE: 2.28138E+00 **DOT Type:** B

 Pu-239 FGE [2U]:
 2.28138E+00
 LSA-I Fraction:
 1.05214E+02
 N

 Pu-239 Eg-Ci:
 1.04371E-01
 LSA-II Fraction:
 2.14704E-02
 Y

 Pu-239 Eq-Ci:
 1.04371E-01
 LSA-II Fraction:
 2.14704E-02
 Y

 Pu-239 Eq-Ci [2U]:
 1.04371E-01
 LSA-III Fraction:
 1.07352E-03
 Y

TRU Pu-239 Eq-Ci: 1.03038E-01 Reportable Quantity: 1.50695E+01 Y

TRU Pu-239 Eq-Ci [2U]: 1.03038E-01 *ALC Ratio: 5.33694E+06 NE

Decay Heat [U] (W): 6.73900E-03 *** ACM Ratio:** 3.15642E+03 NE

Tritium (Ci/m3): 0.00000E+00 **Limited Quantity:** 3.89642E+03 N

TRU ECW PE-Ci: 1.03038E-01

Weight/Volume Used:

1 Container Net Weight: 1.81479E+03 kg *ALC (Activity Limit for Exempt Consignment)
2 Container Volume: 1.01950E+01 m3 *ACM (Activity Concentration for Exempt Material)

U = 1 Uncertainty, 2U = 2 Uncertainty

TASK HISTORY						
Date/ Time	Task ID/ Status	Task Name/ Storage or Disposal Grid Location	Reject			
12/05/1991 12:00 AM	1784523 EXECUTED	LANL:03-CMR » 54-G-DISP:SHAFT304	NO			

Note: Highlighted row indicates container was output or receiving container for the indicated task

DOCUMENTATION
DOCUMENTATION

Doc. Number Title Uploaded By

1 S912719-TWSR WCATS APPLICATION

(000000)

COMMENTS

Date Time/
User Name Comment

08/23/2013 9:37 AM 6ELL 13 STEEL ALPHA BOX IN STEEL BOX PUT IN RH SHAFT WPRF# 00538

WCATS APPLICATION (000000)

EDIT LOG

Date Time/ Quality

User Name Record Explanation



CONTAINER PROFILE \$912719 T-TTRU-TEMP

WS ID: 37017 C ID: 766494 Opt ID: B19455 ACTIVE

EDIT LOG					
Date Time/ User Name	Quality Record	Explanation			
08/23/2013 9:45 PM WCATS APPLICATION (000000)	NO	TRUP.TRUPKG TABLE (WASTEDB): [PKG_ID] = S912719, [ALPHA_CONT] = , [APPROVE_BY] = , [APPROVE_DATE] = , [BETA_GAMMA_CONT] = , [BLDG_CD] = 03-00029, [BX_SERIAL] = , [CERT_STATUS] = , [COLOR_CD] = , [COMMENTS] = 6ELL 13 STEEL ALPHA BOX IN STEEL BOX PUT IN RH SHAFT WPRF# 00538, [CONTENT_CODE] = , [CONTROL] = , [DATE_CLOSED] = , [GAMMA_DOSE] = , [GROSS_WT] = 5600.9205, [GRP] = MST5, [NEUTRON_DOSE] = , [NORMAL] = , [OLDDRUMNUM] = B19455, [OLDVOL_UNIT] = F, [OLDWT_UNIT] = T, [ORG_VOL] = , [ORG_WT] = , [PKG_CD] = 04, [PKG_CD_DESC] = REMOTELY HANDLED CANISTER, [PKG_DATE] = 1991-12-05 00:00:00, [PKG_FISS_GRAMS] = 2.27343223980205474626459383529412379343, [PKG_LOT] = , [PKG_PE_ACT] = . 103155647703821031018955979095733463176, [PKG_TARE_WT] = 1600, [PKG_VOLUME] = 10.195, [PROC_BTCH_CD] = , [PROG_CODE] = X77A, [ROOM] = X77A, [SAMPLE_ID] = , [THERMAL] = .006702218958657873803298804415467803231, [TOTAL_DOSE] = 600, [TOT_ANCG] = 49.0899566030016160432315081393128974096, [TRUCON_CD] = , [WASTE_CD] = 52, [WPRF_CD] = , [WASTE_TYPE] = , [INSP_DATE] = , [AUA_VUA] = , [PROCESS_ID] = , [WGEN_CD] = , [DOT_TYPE] = , [BIR_ID] = LATR05, [RQ] = , [LSA_SCO_CD] = , [LSA] = , [A_START_DATE] = , [BIR_WS] = LA-RM14, [LA_WS] = TA-03-27, [SWBOP] = , [RETRIEVABLE] = , [OFFSITE] = , [LINER_CD] = , [NET_WT] = 4000.9205, [SHIP_CD] = , [WASTE_STREAM] = , [OVERPACK] = N, [REPACKED] = , [INVENTORY_NO] = , [INVENTORY_DT] = , [CHCD_CC_CD] = , [CHCD_CA_CD] = , [CHCD_WP_CD] = , [DOT_DP] = , [WASTE_VERIF] = , [VERIF_COMPLETE] = , [HDL_CD] = , [UPD_WHEN] = 2004-07-02 12:08:37, [UPD_WHO] = 114644, [PHY_STATE] = S, [PKG_H3_ACT] = 0, [QTW] = N, [AK_REPORT] = , [STP] = 0			
08/23/2013 12:33 PM WCATS APPLICATION (000000)	NO	TRUP.UPD_HISTORY TABLE: [UPD_ID]= 12686, [AUTH_BY]= 113199 -> CHRISTENSEN DAVIS V , [AUTH_NUM]= SR318, [PKG_ID]= S912719, [UPD_WHEN]= 03-26-1996, [UPD_WHO]= Z111142 -> LONGLEY JOHN M , [WHAT]= tgrams, tcuries, fiss_grams, thermal, pkg_pe_act,pkg_fiss_grams, [WHY]= Correct errors			
08/23/2013 8:47 AM WCATS APPLICATION (000000)	NO	INITWORKPATH (C_ID=766494/PATH_ID=465): SKIPPED (NO WORKPATH UNITS)			

Los Alamos

Form Number HS 10-2A (12/89)

RADIOACTIVE SOLID WASTE DISPOSAL RECORD **Los Alamos National Laboratory** NOTE: Read instructions on back carefully before completing this form. Los Alamos, New Mexico 87545 1. Form Number HSE-7 Waste Management Ext. 6095, MS J592 2719 s 9 1 4. Origin of Waste 3. Retrievable 5. Waste 2. Date Serial Number Code Group TA Building Wing Program Code M M D D Y 9141515 3 MST X17171A A |4 | 080991 6. Waste Description CELLU 13 5TAINLESS STEEL ALPHA BOX PACKED 7. Numbers of Waste Packages 8. Gross Volume 9. Package Radiation at Drums Wooden Crates M = meter³ F = foot³ G = gallon Card-Surface 1 Meter Plastic Bags Board Boxes No. Gal. Volume-ft3 Amount (mr/hr) (mr/hr) 600 3 6000 F 70 11. Additional Description of Packaging and Packaging Materials 10. Gross Weight = kilogram P = pound T = ton Amount WPRF 00538 2+8 SS Materials Write-Off 12. Radionuclide Content Amount Determined By: (C = curie M = gram) Error on A = analysis Project M = measurement Account +Nuclide Amount \pm Amount Code E = estimate 4 3 8 248 0 0 1 14610 Ε +0 4 7+0 100 E - 1 m A 3 7 5+3 2 5 E - 1c Ε E 448 6 17 8-11 Ε E Ę E Е E 3.91 3 Ε F **APPROVALS** HSE-1/-10/-11 Area Representative (Print Name Here) Additional Signatures (Optional) Waste Generator (Print Name Here) EDBETTER that the waste is as represented here and =(Signature) 14. Disposal/Storage Location 15. Shaft Surface Dose 13. Disposed mr/hr Area Shaft Pit Post(s) Layer Pos D D 20591 HSE-7 Waste-Management Representative (Print Name Here) Received Logbook Computer Verified AC AC handling, and disposal/storage requirements were met. Date Date Date Date Signature 12-5-91 12-5-9 (Signature)

INSTRUCTIONS FOR WASTE GENERATOR

Common the last

Filling Out the Form. The waste generator must complete this form to document all waste buried or retrievably stored at the Laboratory's TA-54, Area G, site. Be sure to complete each section before proceeding to the next section. The waste generator must follow these instructions:

- 1. Don't use more than the allotted spaces on the form (one letter or number per space).
- 2. Ensure that all data recorded on this form are legibly printed and clearly readable.
- 3. Note that the decimal point positions are already indicated in the sections where decimals would be needed (for example, see Section 7 on the front of this form). Enter information accurately in relation to these decimal points. Do not alter decimal point positions.
- 4. Use the number zero (0) on the form ONLY on entries requiring that numerical designation. Do not use the number zero to fill blank spaces.
- 5. Where the amount of information available does not allow recording all data on one form, use additional forms for different portions of the waste.

When the Form is Completed. The waste generator must ensure that the properly completed form accompanies each waste shipment and each package of retrievable transuranic (TRU) waste delivered to the disposal/storage site. Waste generators may keep a copy of the completed form for their files.

PERTINENT INSTRUCTIONS FOR SPECIFIC SECTIONS OF THIS FORM

- **Section 5, Waste Code.** Identify all waste by a 3-digit description code, as given in Attachment I, "Valid Waste Codes." Choose the code that best describes the waste material; especially selecting the most appropriate letter designator, as follows: A = actual contamination; S = suspect contamination; or M = radioactive/hazardous mixed waste.
- **Section 6, Waste Description.** Allow one space for each letter and one space after each word. Use this section to provide any additional information about the waste.
- **Section 9, Package Radiation.** Do not use symbols for "greater than (>)," for "less than (<)," for "greater than or equal to (\ge) ," or for "less than or equal to (\le) ." Round off fractions to the nearest whole number. If radiation levels exceed that which can be listed, leave this section blank and record the data in Section 11.
- Section 11, Additional Description of Packaging and Packaging Materials. Use this space to provide property number, related form numbers, data that cannot be entered in Section 6 or 9 (see above), etc.
- **Section 12, Radionuclide Content.** List radionuclides using either the normally accepted notations (for example, U235, Pu239, Co60, and H3) or, for accountable materials, the element identification plus the SS Material Type Code (for example, Pu52 for plutonium code 52, U38 for uranium code 38). Acceptable codes include MFP for mixed fission products and MAP for mixed activation products.

For nonradioactive chemical or hazardous waste, enter the correct chemical identification, such as CHEM, PCB, or ASBES. If more than one contaminant is identifiable, each contaminant should be listed (with all appropriate data) on a separate line in Section 12. If there are more than six (6) radionuclides identified, or if there are any questions regarding the completion of this form, contact HSE-7 at 7-5397.

Questions regarding the handling or packaging of radioactive or hazardous wastes should be referred to Disposal Site Operations (7-6095).

APPROVAL SIGNATURES

Waste Generator. The waste generator must sign the form in the space allotted to indicate compliance with applicable waste packaging and disposal requirements. This signature is required for all waste, whether radioactive or nonradioactive. Note that both the generator's *printed name* and *written signature* are required.

HSE-1/-10/-11 Area Representative. An area representative from either the HSE-1, -10, or -11 group must sign the form if the wastes are radioactively contaminated. This signature indicates that the package or shipment is safe to handle and transport. Note that both the area representative's printed name and written signature are required.

Additional Signatures. An area representative from HSE-3 or HSE-5 may be required to sign this form before certain hazardous materials are transported. This signature space also may be used for the group leader's signature, if required by the generator's group/division.

Los Alamos

Los Alamos National Laboratory Los Alamos, New Mexico 87545

RSWD	Retrievable
Form Number	Serial Number
s191112171119	01191455

NONCERTIFIED TRU WASTE SUPPLEMENTAL DATA SHEET

		l.	Maste	Gener	ators P	ackage I	nformation					
Organic Material	Weight (lb.)		11.0) E .	11	Organic Ma	aterial Volume	e (%)				10
Intern	al Shielding											
Туре	Thickness	(in.)			10000	Nonradio	active Hazard	lous Mal	erials		100	
None None			Name EPA Code Quantity (g))	
☐ Lead	e E		None • E									
☐ Steel	• E					17575					E	1
☐ Concrete	• E				1.20						E	
Other	. E			M. L.							E	
Internal Pa	ckaging	Additional	Informa	tion				Ti-				
	Plastic bags Number 2 Thickness 3 m: L 90-mil HDPE Liner Blocking Contaminated stainless steel alpha containment bot wrapped in plastic and packed in a 6 ft x 6 ft t 10 ft steel box											
Los Alamos Hea									e require	menis of Ar	1 10-5 01 1	ne
Printed Name	in LEI	BETO	FA	Signatul	re T	ele	eter			Date	6/9	,
THE NAME OF STREET			TO I	SITE	HEALT	PHYSI	CS INFORI	MATIC	N		7.77	
	-1-1-Mark						Ro-30				2126	5
Gamma Dose rate	(mrem/n)	- A	OEI			eter Model			operty No		2630	
Neutron Dose Rate	(mrem/h)		1 6				PNR-		operty No	Control of the later of	5231	
Total Dose Rate (m	nrem/h)	6.	OE	+2	The data Printed N		ion were colle	cted as p	rescribe	Date c	ed proced	lures.
Alpha contamination		13	1 E	+ D	Signature	The state	nnett	05	1-10	AT 8	19/9/	
					7 AUTH	ORIZAT	ION	9			Titl.	
The dala packa	age for this wast	e fias Been i		-				ange/trai	nsøðrtatio	on to TA-54.	3 9	,
Printed Name B	11.			Signatu		-	w.T.	1			3/12/	91
		V. RECE	EIVING	SITE H	HEALTH	PHYSIC	S INFORM	OITAN	N			
Gamma Dose rate	(mrem/h)	11.	E		Survey M	eter Model		Pr	operty No	o.		, by a
Neutron Dose Rate	e (mrem/h)		LET		Survey M	eter Model		Pr	operty No	o.		
Total Dose Rate (n	nrem/h)		IE				ion were colle	cted as p	rescribe	d in approve	ed proced	lures.
Alpha contamination	111	2) •	E	+	Printed N	ame	Section 1			Date		
		-10	E		Signature							
Beta-Gamma Cont	5B (11 /88)		E	+								

PROCEDURES AND INSTRUCTIONS

This form must be used to supplement the information on the Radioactive Solid Waste Disposal Record (RSWD, HS Form 10-2A) when the RSWD is used to document disposal of noncertified transuranic solid waste. A data package containing this form, its related RSWD, and a completed Packaging Condition Inspection form must be sent to the HSE-7 TRU Waste Operations Section (MS E516) for approval before the waste is sent to the TA-54 storage site. All three forms will be returned to the waste generator to accompany the waste to TA-54.

Use scientific notation. Whenever the notation "E" is given in a block, enter the plus or minus sign, as appropriate. Accompany all signatures with a typed or printed name. Use black ink.

RSWD Form Number. Obtain from RSWD form.

Retrievable Serial Number. Obtain from RSWD. Enter this number in the "Waste Package Serial Number" space on the Packaging Condition Inspection form also. That form was intended for use with certified TRU waste but it must also be used with noncertified TRU waste.

I. WASTE GENERATOR'S PACKAGE INFORMATION

The waste generator shall complete the entire section as explained here and then send the form to the area health physics representative.

Organic Mat'l Weight. Enter the total weight of organic material in the package, including the packaging, in pounds (lb).

Organic Mat'l Volume. This is the fraction of the waste package usable volume made unavailable for other waste. Measure or estimate, then round to the nearest 10% and enter.

Internal Shielding. Check the appropriate box and enter the thickness in inches. If "Other" is checked, describe the material in the "Additional Information" block. Lead shielding also must be entered as a nonradioactive hazardous waste.

Internal Packaging. Check the appropriate box(es) and enter data as necessary. If "Other" is checked, describe the material in the "Additional Information" block.

Nonradioactive Hazardous Material. Use name and code number as given in 40 CFR 261, Subparts C and D. If none are listed, enter NONE. Enter the weight in grams.

Statement. Read carefully before signing this important statement. Type, stamp, or print legibly in the "Printed Name" block. The actual signature must be in ink; do not use a rubber stamp for the signature. Enter the date actually signed, not the date from the RSWD.

II. GENERATOR SITE HEALTH PHYSICS INFORMATION

The area health physics representative at the generator's site completes and signs this section. The waste generator then sends the data package to the HSE-7 TRU Waste Operations Office (MS E516) for review and approval.

III. HSE-7 AUTHORIZATION

The HSE-7 TRU Waste Operations Section representative completes and signs this section, thereby authorizing transport. The waste generator must arrange for transportation ONLY AFTER RECEIVING SUCH AUTHORIZATION FROM HSE-7. Refer to AR 10-5. Ensure that the forms received from HSE-7 accompany the waste to the receiving site.

IV. RECEIVING SITE HEALTH PHYSICS INFORMATION

The HSE-1 health physics representative at the receiving site must complete and sign the Receiving Site Health Physics Information section.

Los Alamos National Laboratory Los Alamos, New Mexico 87545

WASTE PROFILE REQUEST

HSE-8 USE ONLY	
Reference Number	
00538	

Complete both sides of this form using a black or blue pen. Inadequate information will result in processing delays. Send completed form to: ATTN: WPRF, MS K490

			·	
ivision/Group MST-5	G67-4653	Mel Stop G-742	Technical Area Buildi	n-29 Room W9-9
		9.9		
Knowledge of Pro	ocess	1	☐ Chemical/Physical Anal	lyses (Specify Below)
MSDS Attached		1	Request For Analysis	Anelysis Atteched
oose one or more o	of the items below which	best describes ye	our waste:	
∏ Flammable	Pesticide	Photographic	Spent Coolent	Plestics
Combustible	☐ Beryllium	Senitary	Aerosol Cens	Filter Media
High Explosive	Asbestos	Radiochemistry	Motor Oil	Vacuum Filter Sludge
Oxidizer	Solvent	Peint Waste	Pump Oil	
Pyrophoric		Laboratory Tras		Cement Peste
= ' '	☐ Weste Rags			Non-Salvageebie
Cyanide	Gless	Metallurgio	UST Remediation	Non-Recycleble
Heevy Metal	Plating Solution	Scrap Metal	Soils	Building Debris
Corrosive	☐ Etchent	Medical/Biologic	eal Environmental	Firing Site Debris
Additional Description		`	- 1	
a_{1}	PHA CONTAI	DMENI	boxes	
neral Description O	f Waste (check at least of	ne block for each	column):	
ORM	FLASH POINT (°F)	рH	REACTIVITY	PCBs
Solid	Less Than 100	12.0 or Lese	Unstable	☐ <50 ppm
Cemented Sludge	☐ 100 to 139	2.1 to 12.4	Reacts With Water	
	140 to 200			
Semi-Solid/Sludge		12.5 or Greater		☐ > 500 ppm
Absorbed Liquid	Greater Than 200	Not Applicable	Sulfides	No PCBs
Liquid	None		Shock Sensitive	
⊒Gas .			Class A or B Explo	31 ∀6
Multi-Layer			Non-Reactive	
Suspended Solids			•	·
Powder or Ash		*		
ndicate Known Rad	lioactivity Of Your Waste	List Known	Radioistopes:	
Not Radioactive (Go 1	To Next Section)	Determined	By Assey Det	termined By Estimete
7	e=6 a.c. t	Rediosotope 1	. 235 u Activity	y/Unit of Measure UA
] < 2.0 nC/g	Alphe		7.10	y/Unit of Measure
] > 2.0 nC/g	Beta			AVOIRE OF MERSONS
] >10.0 nC/g	Gamma	Radiosotope 3	. MF Activity	y/Unit of Measure
> 100.0 nC/g	Tritium	-Radiosotope 4	. MAP Activity	y/Unit of Meesure
				1746
NERATOR CERTIFI				
sed upon my knowledge m is correct. I understei	of the waste, and/or chemical, nd that this information will be	physical analysis, I co made available to reg	ntify that the information provide ulatory agencies and that there is	ed regarding the waste specified on a ere significant penalties for submittin
e information, including	the possibility of fines and imp	risanment for knowin	g violetions.	¥-
nt Generator's Name (La	st, First Mi)	Z Numb	er Generator's Signat	Date Date
EDBETTER	TAMES T	n. 07-	1067 Jed	hether 4.27-
our Group's Weste Cool	rdinator is the custodian of you		oup Weste Coordinators Name (Last, First Mi) Meil Stop
nagement documentatio son (optional).	n, provide the name and mail s		ARCIA DARY	1. 12
m 1346 (4/91)		Page 1 of	DAILY	Complete Reverse Si

Heavy Metals (indicate)	ate whet	her the following	heavy metals e	xist in you	ır waste, at t	he posted conc	entration);
	None			KOP		TCLP Oth	
Arsenic	.æ	☐ < 5.0 ppm	≥ 5.0 ppm	Z	□	→□ □	**
Barium		☐ < 100.0 ppm	☐≥ 100.0 ppm		□	→	
Cadmium	1	☐ < 1.0 ppm	. ☐ ≥ 1.0 ppm	Ti.	□	→ □	
Chromium		< 5.0 ppm	≥ 5.0 ppm	988888	<u> </u>	→ □ □	
Lead	由	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	面	<u> </u>	→ □ □	
Mercury	由	<0.2 ppm	☐≥ 0.2 ppm	Th.		-> □ □	
Nickel	面	-	□≥ 134.0 ppm	币	П <u></u>	-> □ □	
Selenium	面	☐ < 1.0 ppm	□ ≥ 1.0 ppm	Ŧĭ	П—	> □ □	
Silver	Т	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	Ħ	П.—	→ □ □	
Thellium	ī	< 130.0 ppm	☐ ≥ 130.0 ppm		й	-> □ □	
Organic Compounds				ınds exist	in your was	te, at the poster	d concentration):
	None			KOP	Analysis	TCLP Oth	
Berizene	₽	< 0.5 ppm	≥ 0.5 ppm	Ø	Π	-> □ □	
· Carbon Tetrachloride	fi	☐ <0.5 ppm	☐ ≥ 0.5 ppm		H_	→ □ □	
Chlorobenzene	吊	< 100.0 ppm	☐ > 100.0 ppm	#			
Chloroform	帯	☐ < 6.0 ppm	≥ 6.0 ppm	出		→ □ □	
Cresol	#	☐ < 200.0 ppm	☐ ≥ 200,0 ppm	#	<u> </u>	→ □ □	
1,4-Dichlorobenzene		☐ < 7.5 ppm		#	<u> </u>		
1,2-Dichloroethane	;			#			
	7	☐ < 0.5 ppm ☐ < 0.7 ppm		#	H_	 H	
1,1-Dichloroethylene 2,4-Dinitrotoluene	井		≥ 0.7 ppm ≥ 0.13 ppm	#	Ц—	→□ □ □ · · · · · · · · · · · · · · · · ·	
	井	☐ < 0.13 ppm		#	<u> </u>	 _	
Hexachlorobenzene	냁	☐ < 0.13 ppm	☐ ≥ 0.13 ppm	3000000000000000000	<u> </u>		
Hexachlorobutadiene	#	☐ < 0.5 ppm	☐ ≥ 0.5 ppm	出	Ц—	→ → → → → → → → → → → → → → → → → → →	
Hexachloroethane	4	☐ < 3.0 ppm	☐ ≥ 3.0 ppm	Щ	<u>⊔</u> —	<u>→</u> ⊔ ⊔	
Methyl Ethyl Ketone	Щ.	☐ < 200,0 ppm	☐ ≥ 200.0 ppm	Щ	Ц—	<u>→</u> ñ ⊓	
Nitrobenzene	Щ	☐ < 2.0 ppm	≥ 2.0 ppm	Щ	<u> </u>	-> □ □	
Pentachlorophenol	Щ	☐ < 100.0 ppm	☐ ≥ 100.0 ppm	Щ	□	→ □ □	
Pyridine	Ф	☐ < 5.0 ppm	≥ 5.0 ppm	T)	□—	→□ □	
Tetrachioroethylene	Ф	☐ < 0.7 ppm		4	□	> □ □	
Trichloroethylene	Ф	< 0.5 ppm		□	□	→□ □	
2,4,5-Trichlorophenol	Ф	< 400.0 ppm	☐ ≥ 400.0 ppm		□—	→ □ □	
2,4,6-Trichlorophenol	Ф	< 2.0 ppm	☐ > 2.0 ppm			→□ □	
Vinyt Chloride	88888888	☐ < 0.2 ppm				→□ □ →□ □	
	•						
CHECK ONE				_			
Additional hazardor	us compon	ents in the waste are	listed below:	There ar	e no edditional h	azerdous constitue	nts in th i s weste.
Compo	ound Name	C	Concentration (Concentration
104							
1				5			
2	•	<u> </u>		6			
3				7			
4				8			
		SE-8/HSE-7 US					
WARTE OF A SECTION		3E-0/N3E-7 U3	SE CHET (DO	IAOL AAI	ITA DAIOM	illis Lilie)	
WASTE CLASSIFICATION						_	
☐ Non-Radioactive, No	on-Hazardo	W\$	Radioa			Hazardous o	or Mixed
Solid Westa				_	oactive Waste	Hazardo	
☐ Non-Regulated (Chemical V	Vaste		nsuranic W		_	ow-Lavel Waste
Sanitary Waste			∏Spe	cial Nuclea	r Meterial	Mixed T	ransuranic Wasta
Other Non-Dispo	osabia Was	ste					
		6 UE -					
Hazardous or Mixe			10 000 mm - 100			7	
Waste Code 1 Was	te Code 2	Waste Code 3	Waste Code	4 Wa	ste Code 5	Waste Code 6	Waste Code 7
1100 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				D			- NOT A / O /
HSE-8 Reviewer's Signati				Date //	Gost Cent	er/ProgramCode Fo	r HSE Analysis Backcharge
House	m			[///	//		
11 0			Page 2	ot/2			
U							

RADIOACTIVE SOLID WASTE DISPOSAL RECORD

Los Alamos, New Me		DTE: Read inst	ructions on oack c	arefully befo	re comple	ting this form			
1. Form Number									anagement
s 9 1 2719							Ex	t. 6095, M	S J592
2. Date	3. Retrievable	4. Origin of	Waste						5. Waste
M M D D Y Y	Serial Number	Group	TA	Building		Wing	Program Co		Code
018 019 19 1	0119455	MST	5 3	1 1	29	19	V1313	A	4 4 1
	0111755	/4/>//			4 1		* / / /		-
6. Waste Description									
C E L L / 3	STAINL	E 5 5	STEE	A	PH	A B	1 1	9 AC	KED
7. Numbers of Waste Pa	ckages		8. Gross Volume		T Tr	9. Pa	ckage Radia	ition at	
Card- Plastic Board	Drums Wooden	Crates	/ ^N _F	= meter ³	- 1	Surta		1 Mete	
	No. Gal. No. Vo	lume-ft³	Amount (G	= gallon /		(mr/	hr)	(mr/h	ır)
				7.05				T È	1.51.
<u> </u>	<u> </u>	<u> </u>	36000 F			6	00		70
10. Gross Weight	11. Additional	Description of	Packaging and P	ackaging M	aterials	1.1121			
(K = kilo (P = pou	gram \ TIME	capsule	Attached 7	to box					
Amount \\T = ton	1/2/15	TEE	4 BOX			WP	RF	00:	5 3 8
120									
2+8 7				_					
12. Radionucilde Conte	nt				Δ	nount Detern		Materials	s Write-Off
Nuciide	Amount ±	(C = curie (M = gram)	Error on Amount	±	I AM	= analysis = measurer = estimate	\ \ \	ccount	Project Code
						Colimate			
4 3 8 1	2+8 E+	OM	1661	E	04				
4		1/10	41.		234				
Pu 55	7+6 E -	M	4+1	E -	IA				
CS 137	5+3 2 5 E-	10	•	E	E	DC			l
5 R 9 0	4.8 6 7 8-	11 c	1	E	e				
3 K 7 0			E M. O.	1. 6					
Y 9 0 1	4 8 6 7 1 -	1 C	•	E	E				
RU1106	3.9 0 3 E-	13 c	I	E	E				
	1 10		100000410						
Waste Generator (Print Nam	e Here)	HSE-1/-10/-	APPROVALS 11 Area Representat	ive (Print Nam	e Here)	Addit	onal Signature	es (Optiona	0
Jim LEI	BETTER	Ke	uneth	LF	Inli	<u>t </u>			
Signature certifies that the that ALL approable accept	waste is as represented here and ance and disposary storage ature)	nandle an	erulies that wasie pac transport(Signature)	kage or simplif	Len is sale i	•			
X ded	eth		$\neg \cdot (1$	ul	7				
13. Date	14. Disposal/Stora	ne i ocation		4117	POLICE IN] [1	5. Shaft Sur	iace Dose	
13. Date Disposed	Area Shaf		Post(s)	Laye	er Pos.	. 46	mr/hr		
M M D D Y	Y	4 1		Laye			Ī		
1 0 0 0	ent Representative (Print No	ame Here)		4-1	Received			computer	Verified
	all waste receiving, handling.		torage requirement	s were mel	Date	_ A		ate	Date
(Signature Certifies may)	an wasie receiving, righting.	and disposan s			12-5		and the second second		

Form Number HS 10-2A (12/89)

INSTRUCTIONS FOR WASTE GENERATOR

Filling Out the Form. The waste generator must complete this form to document all waste buried or retrievably stored at the Laboratory's TA-54, Area G, site. Be sure to complete each section before proceeding to the next section. The waste generator must follow these instructions:

- Don't use more than the allotted spaces on the form (one letter or number per space).
- 2. Ensure that all data recorded on this form are legibly printed and clearly readable.
- 3. Note that the decimal point positions are already indicated in the sections where decimals would be needed (for example, see Section 7 on the front of this form). Enter information accurately in relation to these decimal points. Do not alter decimal point positions.
- 4. Use the number zero (0) on the form ONLY on entries requiring that numerical designation. Do not use the number zero to fill blank spaces.
- 5. Where the amount of information available does not allow recording all data on one form, use additional forms for different portions of the waste.

When the Form is Completed. The waste generator must ensure that the properly completed form accompanies each waste shipment and each package of retrievable transuranic (TRU) waste delivered to the disposal/storage site. Waste generators may keep a copy of the completed form for their files.

PERTINENT INSTRUCTIONS FOR SPECIFIC SECTIONS OF THIS FORM

Section 5, Waste Code. Identify all waste by a 3-digit description code, as given in Attachment I, "Valid Waste Codes." Choose the code that best describes the waste material, especially selecting the most appropriate letter designator, as follows: A = actual contamination; S = suspect contamination; or M = radioactive/hazardous mixed waste.

Section 6, Waste Description. Allow one space for each letter and one space after each word. Use this section to provide any additional information about the waste.

Section 9, Package Radiation. Do not use symbols for "greater than (>)," for "less than (<)," for "greater than or equal to (\geq) ," or for "less than or equal to (\leq) ." Round off fractions to the nearest whole number. If radiation levels exceed that which can be listed, leave this section blank and record the data in Section 11.

Section 11, Additional Description of Packaging and Packaging Materials. Use this space to provide property number, related form numbers, data that cannot be entered in Section 6 or 9 (see above), etc.

Section 12, Radionuclide Content. List radionuclides using either the normally accepted notations (for example, U235, Pu239, Co60, and H3) or, for accountable materials, the element identification plus the SS Material Type Code (for example, Pu52 for plutonium code 52, U38 for uranium code 38). Acceptable codes include MFP for mixed fission products and MAP for mixed activation products.

For nonradioactive chemical or hazardous waste, enter the correct chemical identification, such as CHEM, PCB, or ASBES. If more than one contaminant is identifiable, each contaminant should be listed (with all appropriate data) on a separate line in Section 12. If there are more than six (6) radionuclides identified, or if there are any questions regarding the completion of this form, contact HSE-7 at 7-5397.

Questions regarding the handling or packaging of radioactive or hazardous wastes should be referred to Disposal Site Operations (7-6095).

APPROVAL SIGNATURES

Waste Generator. The waste generator must sign the form in the space allotted to indicate compliance with applicable waste packaging and disposal requirements. This signature is required for all waste, whether radioactive or nonradioactive. Note that both the generator's *printed name* and *written* signature are required.

HSE-1/-10/-11 Area Representative. An area representative from either the HSE-1, -10, or -11 group must sign the form if the wastes are radioactively contaminated. This signature indicates that the package or shipment is safe to handle and transport. Note that both the area representative's *printed name* and *written signature* are required.

Additional Signatures. An area representative from HSE-3 or HSE-5 may be required to sign this form before certain hazardous materials are transported. This signature space also may be used for the group leader's signature, if required by the generator's group/division.

Los Alamos

RADIOACTIVE SOLID WASTE DISPOSAL RECORD

Form Number 27/9	continuation								E-7 Waste Ext. 6095,	Manageme MS J592
. Date	3. Retrievable	4. Origin	of Waste		-32.41					5. Waste
MNDDYY	Serial Number	Group		TA	Building		Wing	Program	Code	Code
			1 1		1 1	11		1 1	i l	
. Waste Description						14				
7. Numbers of Waste Pa			8. Gros	s Volume			9. Pa	ckage Ra	distion at	
Caro- Plastic Board	Drums Wooden	Crates		1	M = meter ³ v = foot ³		Surfa		1 Me	eter
	No. Gal. No. Vo	lume-ft ³	Amou	unt 1	G = gallon	7 h_	(mr/h		(mr	
		1 1		1				1 1 .		i i
		Y	Value Value	T A A		E Cross			T	
0. Gross Weight	oram \ 11. Additional	Description	of Packag	ing and I	ackaging	Materiale	,			
Amount $ \begin{pmatrix} K = kilo \\ P = pou \\ T = lon $	ňd)	1 1 7	f 1 1	(T	1 1 7	Ϋ́ I	1 1 1 1	1 1	1 1	1 i i
1 1										
2. Radionuclide Conter					- 1 - 2h		÷		SS Materi	als Write-Oi
z. Hadionucine Conter	n	10	, r			F	Amount Determ	ined By:	00 11121011	ald title o
Nuclide	Amount 🖠	(C = cur (M ≈ gra		or on ount	=	L [[]	A = analysis M = measurem E = estimate	nent)	Account	Project Code
RIL 106	3+910 3 E-	3 C	•		Ε	6				
56125	26/1678-	120	•		É	E	<u>:</u>			
FE 125	8 9 9 9 5	3 C	•		E	6				
3 A 1 3 7	4.9 19 15 €-	110	•		E	I E				
m 147	3+0 4 1 E -	2 C	+		E	E				
Fu 155	9+9 5 8 =-	3 C	•		E	E				
			APPR	OVALS						
Vaste Generator (Print Nam	e Here)	H\$E-1/-10	0/-11 Area R			me Here)	Additk	onal Signat	tures (Optio	nai)
Sunature dennies that the lingt ALL appropries accepted within a nave oden me (Signi	welle is as represented thire an incle and disposerrsforage afure)		e certities tha no transpor (S		ckage or ship	meni is sare	2 10			
13. Date Disposed	14. Disposal/Stora			(4)	- Inter	mr n		5. Shaft Samr/hr		80
M M D D Y	Area Shaf	Pit	Post	(s)	Lay	ver Pos	5.			
	ent Representative (Print N	ame Here)		T 4.	- 1	Receive		ok	Compute	r Verified
Signature certifies that a	allywasie receiving handles	and disposal	/storage re	quiremer	ts were me	A-C Date 12-5	A-C Date 9 (12-3		Date	Date

INSTRUCTIONS FOR WASTE GENERATOR

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- 3. Note that the decimal point positions are already indicated in the sections where decimals would be needed (for example, see Section 7 on the front of this form). Enter information accurately in relation to these decimal points. Do not alter decimal point positions.
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Section 12, Radionuclide Content. List radionuclides using either the normally accepted notations (for example, U235, Pu239, Co60, and H3) or, for accountable materials, the element identification plus the SS Material Type Code (for example, Pu52 for plutonium code 52, U38 for uranium code 38). Acceptable codes include MFP for mixed fission products and MAP for mixed activation products.

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Questions regarding the handling or packaging of radioactive or hazardous wastes should be referred to Disposal Site Operations (7-6095).

APPROVAL SIGNATURES

Waste Generator. The waste generator must sign the form in the space allotted to indicate compliance with applicable waste packaging and disposal requirements. This signature is required for all waste, whether radioactive or nonradioactive. Note that both the generator's *printed name* and *written signature* are required.

HSE-1/-10/-11 Area Representative. An area representative from either the HSE-1, -10, or -11 group must sign the form if the wastes are radioactively contaminated. This signature indicates that the package or shipment is safe to handle and transport. Note that both the area representative's *printed name* and *written signature* are required.

Additional Signatures. An area representative from HSE-3 or HSE-5 may be required to sign this form before certain hazardous materials are transported. This signature space also may be used for the group leader's signature, if required by the generator's group/division.

amos National Laboratory Los Alamos, New Mexico 87545

WASTE PROFILE REQUEST

HSE-8 USE ONLY	
Reference Number	
00538	

Complete both sides of this form using a black or blue pen. Inadequate information will result in processing delays. Send completed form to: ATTN: WPRF, MS K490

MST-5	Telephone 667-4653	Meil Stop G-742	Technical Area TA-3	Sm-29	Room Wg-9
⊠ Knowledge of Pr	ocess	1	Chemical/Physi	cal Analyses (Spec	if. Palaud
MSDS Attached			Request For Analys		lysis Attached
	- 1 miles 11 miles	personner -	c powerer en		THE ALLECTION
hoose one or more	of the items below which	best describes you	ır waste:		
Rammable	Pesticide	Photographio	Spent Co	olent Plast	ics
Combustible	☐ Beryllium	Senitary	Aerosol C	ans Filter	Media
High Explosive	Asbestos	Radiochemistry	Motor Oil	☐ Vacu	um Filter Sludge
Oxidizer	Solvent	Paint Waste	Pump Oil	Сели	ent Paste
Pyrophoric	☐ Weste Regs	Laboratory Trash	Capacitor	Oil Non-	Salvageable
Cyanide	Glass	Metallurgio	UST Rem	ediation Non-	Recyclable
Heevy Metal	Pleting Solution	Sorap Metal	Solle	☐ Build	ing Debris
Corrosive	Etchant	Medical/Biological	☐ Environm	ental Firing	Site Debris
Additional Description		NMENT	boxes		
eneral Description O	of Waste (check at least of	ne block for each	column):	-	
FORM	FLASH POINT (°F)	рН	REACTIVITY	PCBs	
Solid	Less Than 100	2.0 or Less	Unetable	□<50	ppm
Comented Sludge	100 to 139	2.1 to 12.4	Reacts W		00 ppm
Semi-Solid/Sludge	☐ 140 to 200	12.5 or Greater	Cyanides	□>50	0 ppm
Absorbed Liquid	Greater Than 200	Not Applicable	Sulfides	No P	CBs
Liquid	None		Shock Se		
☐Gee .	The same of the same		Class A	or B Explosive	
Multi-Layer			Non-Reso	tive	
Suspended Solids					
Powder or Ash		_			
Indicate Known Rad	dioactivity Of Your Waste	List Known i	Radioistopes:		
☐Not Radioactive (Go	To Next Section)	Determined B		Determined By E	stimate
☐ <2.0 nC/g	52 Alphe	Radiosotope 1.	230 L	Activity/Unit of Mea	sure $\protect\ \protect\ $
>2.0 nC/g	⊠ Beta	Radiosotope 2.	239 Pu	Activity/Unit of Mea	eure /
>10.0 nC/g	C Gamma	Radiosotope 3.		Activity/Unit of Mea	sure /
> 100.0 nC/g	Tritium	Rediosotope 4.	LANGE TO LANGE	Activity/Unit of Mee	10
·		.95		-	
rm is correct. I understa ise information, including	of the waste, and/or chemical nd that this information will be the possibility of fines and imp	mede available to regul	etory agencies and ti violations.	on provided regarding that there are significant	the waste specified or t penalties for submitt
	E JAMES T	n. 077	067	Ledhethe	6.27
your Group's Weste Coo anagement documentations arson (optional).	rdinator is the custodien of you on, provide the name end meil s	top of this		s Name (Last, First Mi) ARYLL	Meil Stop

17 日本の一、東京の大学の大学の一、日本の一人の

Heavy Metals (indicate w	hether the following	g heavy metals exis	t in your v	vaste, at the poste	d concentr	ation):
Non			KOP	TCLP	Other	- /
Arsenio	☐ < 5.0 ppm	≥ 5.0 ppm	2	$\square \longrightarrow \square$		1
Arsenic Berium Cadmium Chromium Leed Mercury Nickel Selenium Silver	☐ < 100.0 ppm	☐≥ 100.0 ppm		$\square {\longrightarrow} \bar{\square}$		
Cadmium [☐ < 1.0 ppm		面	$\square \longrightarrow \square$	ä	
Chromium [☐ < 5.0 ppm	≥ 5.0 ppm	900000 8	$\square \longrightarrow \square$	معمممعه	
Lead	☐ < 5.0 ppm		ф	$\square \longrightarrow \square$		
Mercury	☐ <0.2 ppm		ф	$\square \longrightarrow \square$		
Nickel [] <134.0 ppm		由	$\square \longrightarrow \square$		
Selenium	☐ < 1.0 ppm	≥ 1.0 ppm	Ф	$\square \longrightarrow \square$		
Silver	☐ < 5.0 ppm	≥ 5.0 ppm		$\square{\longrightarrow}\square$		
Thellium		☐ ≥ 130.0 ppm	4	$\square{\longrightarrow}\square$		
Organic Compounds (indi	icate if the following	g organic compound			posted co	incentration):
3-0	lone	_	KOP	Analysis TCLP	Other	
Benzene		≥ 0.5 ppm	区	$\square \longrightarrow \square$		
Carbon Tetrachloride	☐ <0.5 ppm	≥ 0.5 ppm	Ψ.	$\square \longrightarrow \square$		
Chlorobenzene	☐ < 100.0 ppm		里	<u></u> ——→ □		
Chloroform	☐ <6.0 ppm	≥ 6.0 ppm	Ψ	□□		
Cresol	☐ < 200.0 ppm		里	□		
1,4-Dichlorobenzene	☐ < 7.5 ppm	□ ≥ 7.5 ppm	77			
1,2-Dichloroethane	☐ < 0.5 ppm	≥ 0.5 ppm	#	<u> </u>		
1,1-Dichloroethylene	☐ < 0.7 ppm	□ ≥ 0.7 ppm	#	<u> </u>	님	
2,4-Dinitrotoluene Hexachiorobenzene	☐ < 0.13 ppm	□ ≥ 0.13 ppm	#		H	
Hexachlorobutadiene	☐ < 0.13 ppm	≥ 0.13 ppm	#		00000000	
Hexachioroethane	☐ < 0.5 ppm	≥ 0.5 ppm	#		片	
Methyl Ethyl Ketone	[]	☐ ≥ 3.0 ppm ☐ ≥ 200.0 ppm	#	<u> </u>		
Nitrobenzene [☐ < 2.0 ppm	≥ 2.0 ppm	#		\vdash	
Pentachlorophenol	☐ < 100.0 ppm	=-	##		000000	
Pyridine	☐ < 5.0 ppm	☐ > 5.0 ppm	##		H	
Tetrachioroethylene	☐ < 0.7 ppm	□ ≥ 0.7 ppm	湍		H	
Trichloroethylene	☐ < 0.5 ppm	□ > 0.5 ppm	14		H	
2,4,5-Trichlorophenol	☐ < 400.0 ppm		Ħ		H	
2,4,6-Trichlorophenol	☐ < 2.0 ppm	□ ≥ 2.0 ppm	Ħ			
Vinyl Chloride	< 0.5 ppm	□ ≥ 0.2 ppm	2000000000000000000	□ > □	ä	
4					_	
CHECK ONE						
Additional hazardous con	nponente in the weste e	re listed below:	There ere no	additional hazerdous	constituents in	n this weste.
Compound N	leme	Concentration				Concentration
1			5			
2			o			
3			7.			
						· ·
4			8.			
	19E-0/19E-7	JSE ONLY (Do N	4Ot Write	Below This Lit	10)	
WASTE CLASSIFICATION					error - Tela	200
Non-Redioactive, Non-Haz	zardoue	Radioactiv			zerdoue or Mi	
Solid Weste			.evel Radioac		Hazardoue V	
Non-Regulated Chemi	cal Wests	_	uranic Waste		Mixed Low-I	
Senitary Weste	10/0000	Specia	al Nuclear M	sterial _	Mixed Trans	urenic wasta
Other Non-Disposable	******					
Hazardous or Mixed Wa	ste Codification:					
Waste Code 1 Waste Cod	10.5	3 Weste Code 4	Weste	Code 5 Waste C	ode 6	Wasta Code 7
	18					
HSE-8 Reviewef's Signature		D	ete / /a	Cost Center/Program	nCode For HS	E Analysis Backcharge
Howard			1/1/9/	'		
		0 0	/			

7.

Page 2 of/2

Los Alamos

Los Alamos National Laboratory Los Alamos, New Mexico 87545

RSWD	Retrievable
Form Number	Serial Number
s 19 1 1 2 17 1 1 19	01191455

NONCERTIFIED TRU WASTE SUPPLEMENTAL DATA SHEET

I. Waste Generator's Package Information

Organic Material	Weight (Ib.)		101	0 E	↓ / Orga	nic Materi	el Volume (%	o)	
	nal Shielding	ener - e	<u> </u>	7915	allen	2 all 100	damn 76		
Type	Thickness	(in.)			Nor	radioactiv	e Hazardous	Materials	
None None					Name			EPA Code	Quantity (g)
☐ Lead	• E		NONE						• E
☐ Steel	• E		Right II	()		10-	Lange For		• E
☐ Concrete	• E	401-14			1- 11			The state of the s	• E
Other	• E								• E
Internal P		Additional	Inform	etion	1000	- 93 - 13 -	116-11		
Plastic bags	ackaging	-		1	1 1	AND STORES	1 1	11	
Number	2	Conti	4m/A	14tes	STAINL	<u> </u>	teel r	elpha c	antainment
Thickness		box 1	wra	sped	in pl	Astic	- 4-	packe	I in a Gof
i hickness	7 24.6	× 61	+ +	10	It ste	el bo	×	15 4 77	
☐ 90-mil HDPE I	Liner						- N- N		
Other		WPRE	= R	e Com	rce Nu	mber	2053	2	
		prepared, pa	ckaged	, and doc	umented such ti	hat it meets	all of the app	licable requirem	ents of AR 10-5 of the
Printed Name 1	alth and Safety	Vianual. Th	e data a	Signatu	1	to the best	of my knowle	dge.	Date g lo lo
	In LEC	BETT	FR	0.3.1.0	Ade s	hell	er		8/9/91
	La Carte	. GENER	RATO	R SITE	HEALTH PH	HYSICS	INFORMA	TION	L S
Gamma Dose rate	e (mrem/h)	6.0	o le	+ 2	Survey Meter	Model A	20-3C	Property No.	002630
Neutron Dose Rat	5 11		. Media	10	Survey Meter	Prince death of	A SHIPT Labor	Property No.	BALL PROBLEM
Total Dose Rate (160	D E	+ 2		-77.4	CARAM SE 1113	10 E 222	in approved procedures.
		1 40	1 -	+ D	Printed Name		1	1 1/2	Date stale
Alpha contaminati		TILE	2 -	HE L	Signature	TEN	Deir	7	W 4/3/11
Beta-Gamma Cor	nt. (dpm/100cm<	3.	3 €	+ 2		1) -	M	4	
		TELE			-7 AUTHOR		THE REAL PROPERTY.	-	
	age for this waste		eviewed			r is authori	zed to arrang	e/transportation	
Printed Name	BRUCE T. R	EICH	200	Signatu	re 6	mul	T. Cu	h	Date 8/12/91
		V. RECE	IVING	SITE	HEALTH PH		A A	TION	,
Commo Doco		•	E	EMEN	TO HITCH THE	EH U			
Gamma Dose rate			28.	1 1	Survey Meter			Property No.	
Neutron Dose Rat	te (mrem/h)	19 19 6	E		Survey Meter	YWA	January State	Property No.	L MIRE
Total Dose Rate (mrem/h)	- 1 P - 1 A 1	E		The data in the Printed Name		vere collected	d as prescribed	in approved procedures. Date
Alpha contaminat	ion (dpm/100cm	2) •	E	+		-		9-	Date
Beta-Gamma Cor	nt. (dpm/100cm ²	Man and	E	+	Signature	atte of a	121-	1	
HS Form Number 10	0-5B (11/88)								

PROCEDURES AND INSTRUCTIONS

This form must be used to supplement the information on the Radioactive Solid Waste Disposal Record (RSWD, HS Form 10-2A) when the RSWD is used to document disposal of noncertified transuranic solid waste. A data package containing this form, its related RSWD, and a completed Packaging Condition Inspection form must be sent to the HSE-7 TRU Waste Operations Section (MS E516) for approval before the waste is sent to the TA-54 storage site. All three forms will be returned to the waste generator to accompany the waste to TA-54.

Use scientific notation. Whenever the notation "E" is given in a block, enter the plus or minus sign, as appropriate. Accompany all signatures with a typed or printed name. Use black ink.

RSWD Form Number. Obtain from RSWD form.

Retrievable Serial Number. Obtain from RSWD. Enter this number in the "Waste Package Serial Number" space on the Packaging Condition Inspection form also. That form was intended for use with certified TRU waste but it must also be used with noncertified TRU waste.

I. WASTE GENERATOR'S PACKAGE INFORMATION

The waste generator shall complete the entire section as explained here and then send the form to the area health physics representative.

Organic Mat'l Weight. Enter the total weight of organic material in the package, including the packaging, in pounds (lb).

Organic Mat'l Volume. This is the fraction of the waste package usable volume made unavailable for other waste. Measure or estimate, then round to the nearest 10% and enter.

Internal Shielding. Check the appropriate box and enter the thickness in inches. If "Other" is checked, describe the material in the "Additional Information" block. Lead shielding also must be entered as a nonradioactive hazardous waste.

Internal Packaging. Check the appropriate box(es) and enter data as necessary. If "Other" is checked, describe the material in the "Additional Information" block.

Nonradioactive Hazardous Material. Use name and code number as given in 40 CFR 261, Subparts C and D. If none are listed, enter NONE. Enter the weight in grams.

Statement. Read carefully before signing this important statement. Type, stamp, or print legibly in the "Printed Name" block. The actual signature must be in ink; do not use a rubber stamp for the signature. Enter the date actually signed, not the date from the RSWD.

II. GENERATOR SITE HEALTH PHYSICS INFORMATION

The area health physics representative at the generator's site completes and signs this section. The waste generator then sends the data package to the HSE-7 TRU Waste Operations Office (MS E516) for review and approval.

III. HSE-7 AUTHORIZATION

The HSE-7 TRU Waste Operations Section representative completes and signs this section, thereby authorizing transport. The waste generator must arrange for transportation ONLY AFTER RECEIVING SUCH AUTHORIZATION FROM HSE-7. Refer to AR 10-5. Ensure that the forms received from HSE-7 accompany the waste to the receiving site.

IV. RECEIVING SITE HEALTH PHYSICS INFORMATION

The HSE-1 health physics representative at the receiving site must complete and sign the Receiving Site Health Physics Information section.

PACKAGING CONDITION INSPECTION

Los Alamos

Los Alamos National Laboratory

Waste Package Serial Number

0019455 Los Alamos, New Mexico 87545 I. GENERATOR'S PRE-USE VISUAL INSPECTION Drum Lot Code initials Inspection Items Year Of Mfgr. Ring, Bolt, & Nut Box Serial No. Lid & Gasket Comments. Chime Dents Gouges Paint This container has been visually inspected and has been found to be free of damage that would make it unsuitable for TRU waste packaging. Signature OBIAS Romero II. DRIVER'S VISUAL INSPECTION This waste package was visually inspected at time of pickup as required by Inspection items Initials approved procedures, and was found to be free of obvious damage or Filter defects. Labels Comments Damage Closure Ring TID Seal No. Signature Montage III. TA-54 INSPECTION Weight (lbs.) This waste package was visually inspected for handling damage before TID Seal No shipping, and, if the package is a drum, the closure ring bolt was tightened Comments: as required by approved procedures. Signature Name Date

HS Form Number 10-5C (11/88)

PROCEDURES AND INSTRUCTIONS

This form must be used to document packages of TRU waste that have been generated according to the Los Alamos TRU Waste Certification Plan. Accompany all signatures with a typed or printed name. Use black ballpoint or ink.

I. Generator's Pre-Use Inspection

The waste generator shall complete this entire section as explained here, then attach this form to the CWSR form (HS Form Number 10-5A).

Drums:

NOTE: Defective lids, bolts, nuts, and closure rings may be replaced. Make note of replacements in the "Comments section."

- Obtain the drum lot code from the side of the drum, above the top rolling hoop. The year of manufacture is the last two digits in the code stamped in the bottom head of the drum. Example: 16-55-88.
- Remove the closure ring and inspect the welds on the lugs for cracks, verify that the bolt and nut are
 present and in good condition, and observe the general condition of the ring.
- Remove the lid and inspect for deformation that would interfere with proper closure. Look for tears in the gasket. Inspect the threads on the bung hole to ensure that a filter can be installed.
- Inspect the body for damage to the chime (top curl) that could cause leakage. Look for dents that
 might permit leakage along the sideseam and the bottom rim seams. Reject drums with gouges that
 significantly reduce the remaining thickness of the drum wall. Severe corrosion or badly damaged
 paint is unacceptable.
- Defective drums must be clearly marked to ensure that they are not inadvertently used for TRU waste.

Boxes:

Inspect boxes in much the same manner as drums except that box lids may not be interchangeable
and the filters may already be installed,

II. Driver's Inspection

- Verify that the waste package contains a filtered vent and that the labels are properly applied to the package and the paperwork.
- Visually inspect the package for handling damage severe enough to bring into question the safety of the package.
- If the package is a drum, check the closure ring to ensure that it is well tightened.
- Enter the tamper seal number.

III. TA-54 (West) Inspection

- Enter the weight in whole pounds.
- Enter the tamper seal number.
- Visually inspect the package for handling damage.

DATE:	7/2/9/			
	Ledbetter, MST-	5,	(6742)	00011-91-07
FROM: Jua	n C. Corpion, HSE-8, MS K4	90		-30°
1 00 to 00 to 10 to 00 t				- M 74
SUBJ: WA	ASTE PROFILE REQUEST	(WP)	R)	On W. Library 2. Associated in
811.0			- IMP TO COMPERMENT OF THE	on a series
			ion has reviewed and logged the information you provide	
			47 de 119	Parties action in the section
A. Non-rad	ioactive/Non-hazardous			The second section
О	Solid waste	٥	Non-regulated chemical	Beautiful (1975) ARZ (C. P. J. C Proc. Phys.
٥	Sanitary waste		Other non-disposable wast	e
B. Radioact	ive		and the state of the	Licola v tyra drighter
а	Low-level	e	Transuranic	के पर्व क्षेत्र के ।
٥	Nuclear Material		V STATES	reposite the appeal and by:
C. Hazardo	ous or Mixed		\	- 125 A
0	Hazardous	0	Mixed low-level	
۵	Mixed transuranic			browning as another gent
				o del Laté - l
valid for or same. Sho	ne year or as long as the comulation waste change, subt	iposi nit a	R(s) in your files for at least 3 ition of the waste you have clause WPR to HSE-8 and atta	haracterized remains the ch a copy of the WPR
Attachmer	nt(s)			A STATE OF THE STA
Attactune	11(3)			

INSTRUCTIONS FOR HANDLING YOUR WASTE

A. Non-Radioactive/Non-Hazardous

Solid Waste

With the exception of classified solid waste, this waste may be placed in a garbage receptacle for removal by Johnson Control personnel.

Non-Regulated Chemical Waste

Complete a Chemical Waste Disposal Request Form (CWDR), attach a copy of the WPR, and send both forms to HSE-7 at MS J593.

Sanitary Waste

This waste may be discharged into an approved sanitary waste line. Contact HSE-8 at 7-5021 if you are unsure whether your sinks are connected to sanitary lines. <u>Do not dispose this waste into an acid waste line.</u>

Other Non-Disposable Naste

This waste is administratively-controlled. Complete a Chemical Waste Disposal Request Form (CWDR), attach a copy of the WPR to the CWDR, and send both forms to HSE-7 at MS J593.

A STATE

B. Radioactive

Low-Level

if the <u>waste is not an squeous low-level radioactive waste</u>, complete a Radioactive Solid Waste Disposal form (RSWD), attach a copy of the WPR to the RSWD, and send both forms to HSE-7 at MS-J592. For <u>aqueous, low-level radioactive</u> waste, complete a Batch Waste Disposal form, attach a copy of the WPR, and send the form to HSE-7 at MS E518.

Transuranic Waste

Complete a Radioactive Solid Waste Disposal form (RSWD), attach a copy of the WPR, and send both forms to HSE-7 at MS J592.

Nuclear Materials

Contact OS-2 (Material Control and Accountability) at 7-5886 for instructions.

C. Hazardous or Mixed

Hazardous Waste

Complete a Chemical Waste Disposal Request Form (CWDR), attach a copy of the WPR, and send both form to HSE-7 at MS 3593.

Mixed Low-Level Waste

Complete a Chemical Waste Disposal Request and a Radioactive Solid Waste Disposal form (RSWD), attach a copy of the WPR, and send all three forms to HSE-7 at MS J593.

Mixed Transurance Waste

Same procedure used for mixed low-level waste.



Appendix E

TRU Waste Storage Information, Container S912717 Stored in Shaft 305 This page intentionally left blank.



TRU WASTE STORAGE RECORD



S912717

l. Generator's Pre-Use	Visual Inspection
------------------------	-------------------

Purchase Order #								ı	nspect	ed Item	ıs			
This container has l	been visually inspected a be free of damage that wo	ccording	to approved	proce	dures and		Ring, Bolt,		T	Chime		De	nts	
packaging.	e nee or damage mat wo	оши ттаке	il urisuitable	2 101 1	KU wasie		Lid and Ga	sket		Gouges		Pa	int	
Printed Name			;	Signa	ture			Sig. Dat	te		Oper.	Date		
2. Generator's P	ackage Information	1												
Group	Technical Area	Buildi	ng		Cost Cente	r	Progra	m Code	Cost	t Accou	nt V	Vork	rk Package	
LTP-PTS	54		000000											
Additional Infor	mation				□ DP □	N	on-DP If	Non-DP	waste,	, attach	DOE a	appro	oval doc.	
							R	adionuc	lide Co	ontent				
													C= Curie	
					Nuclide Am-241			ount		Uncerta	-		/I = Gram C	
Container		Liner					4.636			0.000				
Steel Drum (ŭ ,	☑ Nor			Cs-137		1.170			0.000			С	
☐ Pipe Overpa	• •		mil liner		Pu-238		1.542			0.000			С	
	85 gal Overpack)		mil liner		Pu-239		7.810			0.000			С	
Standard Wa			erboard Lir		Pu-240		5.017			0.000			С	
	ste Box Overpack		l Shieldin	g	Pu-241		1.598				E+000		С	
RH Canister		☑ Nor			Pu-242		1.797E-005 0		0.000E+000			С		
Other (Call T	WCO)	Type	Thickne	ess	Ru-106		8.576	E-003	(0.000	E+000)	С	
Filter Serial No.					Hazardous Materials									
Tinto: Goriai ito:	02						Name			Е	PA Co	de	Qty (g)	
Waste Profile Nu	ımber 5339	3 (WS	ID 370	17)										
Gross Weight (lb	o.)		5.40E+0	003										
Net Weight (lb.)			3.80E+0	003										
Shipping Catego	ry													
LANL Waste Stre	eam ID		TA-03-	-27										
TRUCON Code														
Date Closed (MN					Accumulation Start Date (MM/DD/YY): 12/04/91									
The data in this se Printed Name	ction were collected, an	nd waste	described h		was packaged Signature	an	id labeled ac	cording to	o approv	ed proce				
1 miled Name					Signature					Da	ic.			
3. Generator Site	Health Physics Inf	ormatic	n		•									
Gamma Dose R	ate (mrem/h) (contac	+\			Survey Date	S	Survey Mete	r Model	Property	y Numbe	r Calil	bratic	n Void Date	
Gamma Dose Rate (mrem/h) (contact)				Survey Date	.5	Survey Mete	r Model	Property	v Numbe	r Calil	hratic	n Void Date		
Neutron Dose Rate (mrem/h) (contact)				Currey Bate		survey moto	Model	roport	y riambe		oranc	ni voia Bato		
Total Dose Rate (mrem/h) (contact)				•					•					
Total Dose Rate (mrem/h) (1 meter)				The data in t		section were	e collecte	d accord	ling to a	<u> </u>	•	edures.		
Alpha Contamina	ation (dpm/100cm2)				Printed Nam	е					Date	9		
Beta-Gamma Co	ont (dpm/100 cm2)				Signature									



TRU WASTE STORAGE RECORD

Printed Name



Date:

4. TRU Waste Management Review/Authorization

The data package for this waste has been reviewed. Basedon the

iriiormalion provided, l	mis waste meets in	SIOI								
storage at TA-54.		Signatur	е							
5. Preload Visual In	spection		•							
This waste package was visually inspected prior to transport according to approved procedures. It meets WAC packaging and labeling requirements and is free from obvious damage and defects.				Name			Date	e:		
6. Receiving Site He	ealth Physics Inf	formation								
Gamma Dose Rate (mrem/h) (contact)				Date	Survey Meter Mod	el Prope	rty Number	Calibration Void Date		
Neutron Dose Rate	(mrem/h) (contac	et)	Survey [Date	Survey Meter Mod	el Prope	rty Number	Calibration Void Date		
Total Dose Rate (m	rem/h) (contact)					•				
Total Dose Rate (m	rem/h) (1 meter)		The data	in th	is section were colle	cted acco	rding to app	roved procedures.		
Alpha Contaminatio	n (dpm/100cm2)		Printed N	Name				Date		
Beta-Gamma Cont	(dpm/100 cm2)		Signatur	Signature						
7. Storage Site Info	rmation									
Received by (Initials)		Date Received			Or	ginal Sto	orage Data	ı		
This waste package w and in good condition. procedures.				Building Number Layer Column Number Date \$		Date Stac	Row Number cked (MM/DD/YY)			
Printed Name		Data		Printed Name						
Printed Name		Date						Date:		
Signature				Signature						
8. Waste Acceptand	e Office									
Intials/Date			V	/E D	escription					
NCR Number	Intials/Date				NCR Descrip	ion				



TRU WASTE STORAGE RECORD



9. Continuation Sheet for Radionuclide Content (from Page 1, Section 2)

Nuclide	Amount	Uncertainty	C= Curie M = Gram
Sr-90	1.069E+000	0.000E+000	С
U-234	3.931E-004	0.000E+000	С
U-235	1.227E-005	0.000E+000	С
U-236	1.619E-006	0.000E+000	С
U-238	1.135E-007	0.000E+000	С
Y-90	1.069E+000	0.000E+000	С

10. Continuation Sheet for Hazardous Materials (from Page 1, Section 2)

Hazardous Materials						
Name	EPA Code	Qty (g)				
No Additional Hazardous Materials						



CONTAINER PROFILE S912117 **WDB-CON-LLW**

Status:

WS ID: 35716 C ID: 560350 **ACTIVE**

GENERAL INFORMATION

Decommissioned:

Container Subtype:

Container Type:

Origin Date:

Container ID: 560350 Labeled ID: S912117

Optional ID:

Chemical Barcode:

Physical State:

Waste Stream ID: 35716

Work Path: WDB-CON-LLW

Quantity (Univ):

Compactible:

Accum Start Date:

Closed Date:

Discard Matrix:

TID(s):

Gen Contact:

Insert By: WCATS APPLICATION (000000)

Waste Desc: [SYSTEM PROFILE] FOR CONSOLIDATING & PACKAGING WASTE

WEIGHTS AND VOLUMES

Container Volume: 4.30 CM **Gross Weight:** 1129.40 lb

Waste Volume: **NOT SPECIFIED Tare Weight:** 0.00 kg

> **Net Weight:** 512.29 kg

LOCATION

Pickup (Origin): LANL: 55: GEN-AREAS

Current: LANL: 54-G-DISP: PIT37: 28

COST CODES

Cost Prog Cost Work Percent Cost Center **Cost Code**

Code **Allocation** Center Account **Package** Status **Status Recharge Mode**

SELECTION LIST

OT: Other (WCATS Specific)

04-Jun-1991 12:00 am

ACTIVE

Unspecified

NO

		F	RADIOLOGIC	CAL SURV	EY		
Survey Type	Instrument Number	Survey Date	At Contact mrem/hr	At 30 cm mrem/hr	At 1 M mrem/hr	Alpha dpm/100cm2	Beta/Gama dpm/100 cm2
Survey ID: 40603	3, Status: Active						
B/G Survey			= 0.00	=	= 0.00	Not Ap	oplicable



CONTAINER PROFILE \$912117 WDB-CON-LLW

WS ID: 35716 C ID: 560350 ACTIVE

	RADIONUCLIDES							
Nuclide	Amount	Unit	Uncert	MT Derived (Y/N)	Activated (Y/N)	MDA Result (Y/N)	Normal Form (Y/N)	Measurement Code/Comment
Status: Active	e, Assay Page:	218239, E	Date: 03/01/201	2, Deriv	ation: S	System	Partitio	ned (e.g., Packaging or Processing)
Am-241	1.24E-003	Ci	0.00E+000	N			Y	
Pu-238	5.97E-005	Ci	0.00E+000	N			Y	
Pu-239	2.03E-003	Ci	0.00E+000	N			Y	
Pu-240	4.74E-004	Ci	0.00E+000	N			Y	
Pu-241	7.20E-003	Ci	0.00E+000	N			Y	
Pu-242	2.74E-008	Ci	0.00E+000	N			Y	
U-234	4.33E-009	Ci	0.00E+000	N			Y	
U-235	7.53E-011	Ci	0.00E+000	N			Y	
			D.4	D 04		I A TIZ	2110	

RAD CALCULATIONS

Total Activity (nCi/g):	2.14723E+01	DOTFissile Mat (g):	3.27494E-02	
Alpha (nCi/g):	7.41684E+00	Transport Index:	0.0	
TRU Alpha (nCi/g):	7.41648E+00	NRC Class:	A	
Pu-239 FGE:	3.28782E-02	DOT Type:	A	
Pu-239 FGE [2U]:	3.28782E-02	LSA-I Fraction:	9.32035E+00	N
Pu-239 Eq-Ci:	3.95901E-03	LSA-II Fraction:	2.83078E-03	Y
Pu-239 Eq-Ci [2U]:	3.95901E-03	LSA-III Fraction:	1.41539E-04	Y
TRU Pu-239 Eq-Ci:	3.95901E-03	Reportable Quantity:	3.87138E-01	N
TRU Pu-239 Eq-Ci [2U]:	3.95901E-03	* ALC Ratio:	3.25135E+04	NE
Decay Heat [U] (W):	1.22694E-04	* ACM Ratio:	2.79611E+02	NE
Tritium (Ci/m3):	0.00000E+00	Limited Quantity:	1.45017E+02	N
TRU ECW PE-Ci:	3.95901E-03			

Weight/Volume Used:

1 Container Net Weight: 5.12288E+02 kg *ALC (Activity Limit for Exempt Consignment)
2 Total Item Volume: *ACM (Activity Concentration for Exempt Material)
U = 1 Uncertainty, 2U = 2 Uncertainty

	TASK HISTORY					
Date/	Task ID/	Task Name/	Reject			
Time	Status	Storage or Disposal Grid Location				
06/04/1991	516620	LANL:54-G-DISP - PIT37	NO			
12:00 AM	EXECUTED	POST 28:LAYER 05:POSITION NORTH				



CONTAINER PROFILE S912117 WDB-CON-LLW

WS ID: 35716 C ID: 560350 ACTIVE

		TASK HISTORY	
Date/ Time	Task ID/ Status	Task Name/ Storage or Disposal Grid Location	Reject
06/04/1991 12:00 AM	348725 EXECUTED	LANL:55 - C-CONSOLID	NA

Note: Highlighted row indicates container was output or receiving container for the indicated task

		EDIT LOG
Date Time/ User Name	Quality Record	Explanation
11/09/2012 3:07 PM WCATS APPLICATION (000000)	YES	C_MASTER.VOL_CONTAINER_UNIT [560350] changed from gal to CM (see SCR.2012.11.08.A)
02/28/2012 11:20 AM WCATS APPLICATION (000000)	NO	WASTEDB.LOCATION TABLE: [LOC_ID]= 177895, [CON_ID]= S912117, [LOC_CD]= 37 -> Pit 37, [RECDATE]= 1991-06-04 00:00:00, [TMESTAMP]= 2006-10-13 16:07:54, [USRSTAMP]= 113170 -> SLOAN TIMOTHY J , [X_COOR]= 28, [Y_COOR]= 0, [Z_COOR]= 5, [POSITION]= N
02/28/2012 8:26 AM WCATS APPLICATION (000000)	NO	CHEMLL.CONTAINER TABLE: [CHECKBY]= -> , [CHECKDATE]= , [CHEM_STATE]= , [DISPOSITION_CD]= DS -> DISPOSAL - CHEM/LLM, [DOTCON_CD]= 99 -> , [DOTHAZ_CD]= -> , [DOTSHIP]= , [DOTUNNA_CD]= , [DOT_DESC_CD]= , [DOT_TYPE]= , [ERGNO]= , [FISSILE_CLASS]= , [HAZ_SUB]= , [HWTYPE]= , [LABEL_CAT]= , [LABEL_SEC]= , [LIM_QUANT]= , [LSA]= , [MANIFEST_LNUM]= , [MANIFEST_PNUM]= , [NRC_CLASS]= , [OTHERCONID]= , [PACKING_GRP]= , [PICKBY]= -> , [RCV_CONV_VOL]= , [RCV_CONV_WGT]= 512.29623108825, [RCV_DATE]= 1991-06-04 00:00:00, [RCV_METER_RAD]= 0, [RCV_SURFACE_RAD]= 0, [RCV_VOL]= , [RCV_WGT]= 1129.4008621875, [RGN_CD]= -> , [TARE_WGT]= , [TECH_NAME]= , [TMP_CON_ID]= , [TRANS_INDEX]= , [UPD_WHEN]= 2011-12-22 14:44:52, [UPD_WHO]= W113170 -> , [VUNIT_CD]= -> , [WUNIT_CD]= P -> POUND, [HAZSUB_FLAG]= , [OSWP]= , [ROAD_CLOSURE]= , [LSA_SCO_CD]= -> , [RAD_RQ]= , [COMPACT]= , [COMPACTDATE]= , [WASTE_VERIF]= , [VERIF_COMPLETE]= , [HDL_CD]= , [ACCUM_START]= , [CLOSED]= , [USRSTAMP]= -> , [TMESTAMP]= , [ALPHA_CONT]= , [BETA_GAMMA_CONT]= , [TOTAL_DOSE]= , [REPACK]=
02/27/2012 3:51 PM WCATS APPLICATION (000000)	NO	INITWORKPATH (C_ID=560350/PATH_ID=105): FAILED (NO WORKPATH UNITS)

Los Alamos

RH-TRU

RADIOACTIVE SOLID WASTE DISPOSAL RECORD

Los Alamos National Laboratory

NOTE: Read

NOTE: Read instructions on back carefully before completing this form.

os Alamos, New Me	exico 87545 NC) / E: Read instructions of	on back carefully before	e completing this form	
1. Form Number					HSE-7 Waste Management Ext. 6095, MS J592
s 9 1 2717					
2. Date	3. Retrievable Serial Number	4. Origin of Waste	TA Puilding	Wing	Program Code 5. Waste Code
MMDDYY	Serial Number	Group	TA Building	<u> </u>	
080991	119525	MST 5	3	29 9	X 7 7 A A 4 1
6. Waste Description					
C E L L 9	STAINLE	SSSTE	CC ACP	H A B 0	1 PACKED
7. Numbers of Waste Page			Volume	9. P	ackage Radiation at
Card- Plastic Board	Drums Wooden		$M = meter^3$ $E = foot^3$	Surf	
Bags Boxes 1	No. Gal. No. Vo	lume-ft ³ Amou	nt G = gallon /	(mr/	/hr) (mr/hr)
			, _		
		360	OF		900
10. Gross Weight	11. Additional	Description of Packagi	ng and Packaging Ma	terials	
/K = kilo P = pou			LE d to box		
Amount $T = \text{pour}$		TEEL	3 0 X	WP	RF 00538
	7 70 3	, , ,			
207 7			_		
12. Radionuclide Conter	nt				SS Materials Write-Off
		(C. gurio) Erro	ır on	Amount Deter	- 1 1 1 1 1 1
		(M = gram)	ount ±	A = analysis M = measure	
Nuclide	Amount ±	Allic	Juni	\ E = estimate	Code
4 3 8	6+1 0 0 E+	10 m 3 + 5	5 0 0 E +	6 4	
0	1.5 OD E +	10 m 8 45	100 E -	I A	
P 4 5 5	145				
C5137	1+1170E+	OC	E	ϵ	
5 R 9 0	1+0169 Et	- o c •		E	
5 R 9 0	1 0 6 7 5 7				
Y 90	100 6 9 E +	- 0 (E	E	
	g r r l n l l e			E	
Ru 106	8 + 5 7 6 = -	3 4			
		APPR	OVALS		
Waste Generator (Print Nam	ne Here)	HSE-1/-10/-11 Area R	epresentative (Print Name	e Here) Addi	itional Signatures (Optional)
	EOBETTER	Kewnet	t waste package or shipme	ent is safe to	
Signature cettifies that the that ALL applicable accept criteria have been mell Sign	waste is as represented here an lance and disposal/storage	handle and transport(S	Signature)		
criteria have lieen mett.sign	e e tu	1 K.	111/1		
			<u> </u>		45 Obell Contess Dass
13. Date	14. Disposal/Stora				15. Shaft Surface Dose
Disposed	Area Shar	t Pit Post	(s) Laye	r Pos.	1117/11
M M D D Y 12059		15 1	T		
	nent Representative (Print N	ame Here)		Received Logb	book Computer Verified
	CATANA	and diaponal/storage re	autirements were met	Date Date	Date Date
Signature certifies that	all waste receiving handling,	and disposal/storage re	quirements were met.		Date Date

Los Alamos National Laboratory Los Alamos, New Mexico 87545

RSWD	Retrievable						
Form Number	Serial Number						
s 19 1 1 2 17 1	1 7	0	1	9	5	2	س

NONCERTIFIED TRU WASTE SUPPLEMENTAL DATA SHEET

		1. V	vaste G	ener	ator's Package I	ntormation			
Organic Material Wei	ight (lb.)		1.0	E +	/ Organic Ma	iterial Volume (%)	6	
Internal S									
Туре	Thickness	(in.)			Nonradios	active Hazardous	Materials	T	
None					Name		EPA Code Quantity (g)		
☐ Lead	• E			الد	ONE			• E	
☐ Steel	• E							• E	
☐ Concrete	• E							• E	
☐ Other	• E							• E	
Internal Packa	ging	Additional In	formatio	า					
Plastic bags		c. L			-4.11	tool do	/	1	
Number 2		CONTAM	IINATE	<u>-0 :</u>	THINCESS' S	reec Acpi	ra cony	AINMENT DOX	
Thickness MIL		wrapp	ne d	<u></u>	perstic A	nd pack	ed IN	AINMENT box	
		X 10 fx	f 5+	eel	- box		···	·	
☐ 90-mil HDPE Liner Blocking					- Live				
Other		WPRF	Refe	سهوسوه	ce Numbe	- 00538			
		prepared, paci	kaged, and	d docu	mented such that it many complete to the b	eets all of the appli		ents of AR 10-5 of the	
Printed Name	1	ETTER	Sic	matur	- 	Žiu.		Date 8/9/91	
				ITE	IEALTH PHYSIC	S INFORMA	TION	·	
Gamma Dose rate (mre		8.0			Survey Meter Model			002630	
Neutron Dose Rate (mi		• 0	1 1.		Survey Meter Model	4		005231	
Total Dose Rate (mrem		8.0	E +	. 1				n approved procedures.	
Alpha contamination (d			F +	1	Printed Name 1	unoth		Date 8/9/9/	
Beta-Gamma Cont. (dp		1./	E +	2	Signature	Solar	0+		
•			III. F	ISE-	AUTHORIZAT	ION	-,		
The data package f	or this waste	has been rev			The generator is aut	horized to arrange	transportation		
Printed Name	RUCE T.	REICH	Sig	nature	Drew	T. Cuil		Date 8/12/91	
		V. RECEIV	ING SI	TE H	EALTH PHYSIC	S INFORMAT	ION		
Gamma Dose rate (mre	em/h)	•	E		Survey Meter Model		Property No.		
Neutron Dose Rate (mr			E		Survey Meter Model		Property No.		
Total Dose Rate (mrem		•	E			on were collected		n approved procedures.	
Alpha contamination (d		2) •	E +		Printed Name	***************************************		Date	
		1	1 1		Signature			<u> </u>	
Beta-Gamma Cont. (dp	1/100CM2		E +						

LOS Alamos Los Alamos National Laboratory Los Alamos, New Mexico 87545

Form 1346 (4/91)

WASTE PROFILE REQUEST

HSE-8 USE ONLY	
Reference Number	
00538	

Complete Reverse Side

Complete both sides of this form using a black or blue pen. Inadequate information will result in processing delays. Send completed form to: ATTN: WPRF, MS K490

Division/Group	Telephone	Mail Stop		Ruilding	Room
MST- 5	667-4653	G-742	TA-3	5m-29	wg-9
Knowledge of Pro	cess	, -	Chemical/Physical A	Analyses (Specify	Below)
hoose one or more or	f the items below which	best describes you	ır waste:		
Flammable Combustible High Explosive	Pesticide Beryllium Asbestos Solvent	☐ Photographic ☐ Sanitary ☐ Radiochemistry ☐ Paint Waste	Spent Coolant Aerosol Cans Motor Oil Pump Oil	Filter Me	Filter Sludge
☐ Oxidizer ☐ Pyrophoric ☐ Cyanide ☐ Heavy Metal ☐ Corrosive	Weste Rags Glass Plating Solution Etchant	Laboratory Trash Metallurgic Scrap Metal Medical/Biological	Capacitor Oil UST Remediat	☐ Non-Sal	vageable cyclable Debris
Additional Description		N M FNT	boxes		
	Waste (check at least o				
ORM	FLASH POINT (°F)	рH	REACTIVITY	PCBs	
Solid Cemented Sludge Semi-Solid/Sludge Absorbed Liquid Liquid Gas Multi-Layer Suspended Solids Powder or Ash	☐ Less Than 100 ☐ 100 to 139 ☐ 140 to 200 ☐ Greater Than 200 ☑ None	☐ 2.0 or Less ☐ 2.1 to 12.4 ☐ 12.5 or Greater ☐ Not Applicable	☐ Unstable ☐ Reacts With W ☐ Cyanides ☐ Sulfides ☐ Shock Sensitiv ☐ Class A or B E Non-Reactive	☐ > 500 ;	ppm pm
Indicate Known Rad	ioactivity Of Your Waste	List Known	Radioistopes:		
Not Redioactive (Go T		Determined B	By Assay	Determined By Esti	
>2.0 nC/g	☑Alpha ☑Bets ☑Gemma ☑Tritium	Radiosotope 1. Radiosotope 2. Radiosotope 3. Radiosotope 4.	239 Pu AC	ctivity/Unit of Measur ctivity/Unit of Measur ctivity/Unit of Measur ctivity/Unit of Measur	
form is correct. Lunderstar	of the waste, and/or chemical/ nd that this information will be the possibility of fines and imp	made available to regu	latory agencies and that to violations.	nere are significant p	waste specified on this enalties for submitting
LEDBETTER			067 up Waste Coordinators Ne	Shetter	4.27-9 Mail Stop
If your Group's Waste Coor management documentation person (optional).	dinator is the custodian of you n, provide the name and mail s	top of this	RCIA DAI	j.	Mail Stop 730

Page 1 of 2

i leavy lvietais tii	er er er gelek kirker och by gen	ther the following	neavy metals ex	ust in your	waste, at the	e posted conce	intration):
	None			КОР	_	TCLP Othe	
Arsenic	<u> 8</u>	2.24-1-1	_	Z (→□ □	,
Barium ****	1	☐ < 100.0 ppm	≥ 100.0 ppm	1		→□ □	-
Cedmium	74	☐ < 1.0 ppm	1.0 ppm	Φ		→ □ □	
Chromium	Ф	_	≥ 5.0 ppm	ंक	<u> </u>	→ □ □	
Lead	中	☐ < 5.0 ppm	≥ 5.0 ppm	ф		→ □ □	
Mercury	Ф	<0.2 ppm	≥ 0.2 ppm	由	□	→ □ □	
Nickel			□≥ 134.0 ppm	由		→ □ □	
Selenium *	巾	☐ < 1.0 ppm	≥ 1.0 ppm	ф Ф		→ □	
Silver	(☐ < 5.0 ppm	≥ 5.0 ppm	山		→ □ □	
Thellium		<130.0 ppm	☐≥ 130.0 ppm	131	<u> </u>	→ □	
rganic Compou	unds (indicat	te if the following	organic compou	nds exist in	your waste		concentration):
	None			КОР	Analysis	TCLP Othe	
Benzene	⊠	☐ < 0.5 ppm	≥ 0.5 ppm	Ø		→ □ □	
Carbon Tetrachic	oride 🗍	☐ <0.5 ppm	≥ 0.5 ppm		<u> </u>	→ □ □	
Chlorobenzene	活	< 100.0 ppm	☐ ≥ 100.0 ppm		<u> </u>	> ====================================	
Chloroform	Th.	☐ < 6.0 ppm	≥ 6.0 ppm	Б	П <u></u> -	>	
Cresol	. Ж	☐ < 200.0 ppm	☐ ≥ 200.0 ppm	ф	Π	>	
1,4-Dichlorobenz	m	☐ < 7.5 ppm	≥ 7.5 ppm	ä	H	>	
1,2-Dichloroetha	=	☐ < 0.5 ppm	☐ ≥ 0.5 ppm	H	<u> </u>	>	
1,1-Dichloroethy		☐ < 0.7 ppm	≥ 0.7 ppm	H		→ □ □	
2,4-Dinitrotoluen	= = = = = = = = = = = = = = = = = = =	☐ < 0.13 ppm	≥ 0.13 ppm	#			
Hexachlorobenze	=======================================	☐ < 0.13 ppm	☐ ≥ 0.13 ppm	#		> □ □	
Hexachlorobutad	- =	☐ < 0.13 ppm	☐ ≥ 0.13 ppm	#			
Hexachloroethan	=	☐ < 3.0 ppm		08888888 8		> □ □	
Methyl Ethyl Ket	4	_		出		> □ □	
	one III	☐ < 200.0 ppm	☐ ≥ 200.0 ppm	#		>	
Nitrobenzene	- #	☐ < 2.0 ppm	☐ ≥ 2.0 ppm	#	<u> </u>	<u>→</u> □ □	
Pentachlorophen	° Ψ	☐ < 100.0 ppm	≥ 100.0 ppm	里	<u> </u>	> □ □	
Pyridine	出	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	Щ	<u></u> □	> □ □	
Tetrachloroethyle	ene <u> </u>	☐ < 0.7 ppm	≥ 0.7 ppm	Щ	<u></u> □	→ □ □	
, Trichloroethylene	4	☐ < 0.5 ppm		_	□	> □ □	
2,4,5-Trichloropl	henol III	C < 400.0 ppm	☐ ≥ 400.0 ppm	9	□	→ □ □	
2,4,6-Trichloropi	henol II	☐ < 2.0 ppm		9	<u> </u>	> □ □	
Vinyl Chloride	T P	☐ < 0.2 ppm		Œ		->	
HECK ONE		•					
			Parall 1	r	1.6.		
		nents in the waste are	7	X there are n	o additional haz	ardous constituen	ts in this waste.
C	ompound Name	•	Concentration				Concentration
1.				c			
··		·		ə			
2	•	.*		•			
۷				6			
_				_			
3				7			
_							
4.				8			
		ISE-8/HSE-7 US	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				
ASTE OF ACCUSE			JE CHEL (DO	IAOC AALIE	Pelow II	no Lille)	
ASTE CLASSIFICA		•	·				
Non-Radioactiv		ous	Radioac	tive		Hazardous or	Mixed
Solid Wast		en e		-Level Radioad		Hazardou	s Waste
Non-Regula	sted Chemical V	Waste .	[☐ Tran	suranic Waste	•	■ Mixed Lo	w-Level Waste
Sanitary W	asto		Spec	cial Nuclear M	aterial	Mixed Tr	ansuranic Waste
Other Non-	Disposable Wa	ste		-			
· · · · · · · · · · · · · · · · · · ·						•	•
Hazardous or N	Mixed Waste	Codification:				· .	
aste Code 1	Waste Code 2	Waste Code 3	Waste Code 4	Waste	Code 5	Waste Code 6	Waste Code 7
		and the second	·				
SE-8 Reviewer's S	ignature		1	Date / /	Cost Center	/ProgramCode For	HSE Analysis Backch
////	non			7/1/9		=	•
7000	roro		Page 2	of D / / /	_ 1		

Los Alamos
Los Alamos National Laboratory

RADIOACTIVE SOLID WASTE DISPOSAL RECORD

Los Alamos, New Mex	ico 87	7545		٨	IOTE	: Re	ad inst	ructions	on ba	ack ca	refully	befo	re com	pleting t	his forn	n.				
1. Form Number																ſ			Manageme	ent
s 9 1 2717																L		Ext. 6095, I	MS J592	
	. Retrie	vable			4	. Ori	gin of	Waste								T			5. Waste	
M M D D Y Y		Numbe	r			Grou	р		TA	4	Buildir	ng		Win	g	Pro	gram	Code	Code	-
	<u> </u>	سم ا ۵	I	سم ا	 	an i c	1	1 1	١,	3	1	ı	29		19	Y	717	. 4	A 4	,
	0 1	95	عم	J				3						_ <u></u>		1	/ (7 7 1	7	<u>~</u>
6. Waste Description																			·····	_
CELL 9	5/1	A 1 1	ما لا	<u>.</u> 6	<u> </u>	S	5	TE	ادا	د _	A	LA	0 4.	A	Bo	/	P	ACK	: ೯ <u>៦</u>	
7. Numbers of Waste Pack	ages							8. Gros	ss Vol	ume					9. P	ackaç	je Rac	diation at		
Card-	Drum	s	Wo	ode	n Cra	tes		-		(M)	= met	er ³ \			Surf	ace		1 Me	 eter	
Plastic Board Bags Boxes No). G	al. 1	No.	. \	/olum	e-ft³	_ -	Amo	unt	∖ G	= gallo	on)		┦├	(mr	/hr)		(mr/	<u>/hr)</u>	_
	i							_												
	1 •	<u> </u>	•			•		36	000	F					8	3 0	0		191	0 •
10. Gross Weight		11. /	Addit	ion	al Des	crip	ion of	Packag	ging a	nd Pa	ckagi	ng N	laterial	B						
/K = kilogra P = pound	am \	→ 	ME					4 HAC										· · · · · · · · · · · · · · · · · · ·		٦
Amount $T = ton$	<u>') </u>		~	1	ST	E	E	L	8 0	x		1	1 1	1	WP	R	FΙ	00	53	8
					<u> </u>		1 - 1	<u>- 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1</u>	<u> </u>		11						·		1- 1- 1	
2.7 T																				
12. Radionuclide Content																		SS Materia	als Write-C	Off
						/C =	curie\	Eri	ror on			,	`		nt Deter				Project	.
Nuclide	Amo	unt		1	±	(M =	curie) gram		nount			1±	.	M= m	nalysis neasure	ment)	Account	Code	ļ
TYDONAC				\dashv		+	Ţ					+-		\ E = e	stimate	,			- 3333	\dashv
	/	ı	,					3+	ا سے	1	E		اما							
<u>u 3 8 0</u>	6+1		1	E	+0	M		2 •	۱ د		- -	+	- 6	4			ŀ		+	\dashv
P455	1+5			Е	+ 6	m		84.	5		E	_	.	A						
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5 R 9 0	10	16	9	Ε	+ 0	C		•			E			E						_
V C +		1.7	10					1	ı	1				E						
y 7 0	1 + 0	6	9	Е	+ (2 \	-	-				+	1				}	w		\dashv
Ru 106	8 + 5	5 7	6	Ε	- 3	0	_	•	1		1	=		E						
Waste Generator (Print Name)	Herel					HSE-	1/-10/-	APPF 11 Area	Repres	ALS sentati	ve (Prir	nt Nan	ne Here)		Add	itional	Signat	tures (Optio	nal)	
Jim LE	OBI				-	1	Len	vne '	H		_ /	4	4	afe to		***				
Signature cettifies that the wa that ALL applicable acceptant criter a have been met/Signature	ice and d	represer hsposal/s	ntea n storagi	ere a	and			≱ranspor) <i>[</i>	J		., 0 . 0						
Xdedh	نا	tu					1	1.1	\mathcal{U}	W	1									
13 Date	7 6	14. Disp	neal/	Sto	race l	OCE	tion								Γ	15. S	haft S	urface Do	se	1
Disposed			, Joan/		aft		Pit	Po	st(s)				er F	os.			mr/hr			1
MMDDYY	7 1	Area	+) .		_+	1 11	+ 0.				-47				1				
12015191				5 (215	>			<u></u>	<u></u>			<u></u>		L					
HSE-7 Waste Managemen													Rece		Logt /-)-(_		Compute		d
Signature certifies that all	waste	receiving	har	jalih	g, and	disp	osal/s	torage r	equire	ement	s were	met.	Date		Date			Date	Date	
(Signature) \ \(\int_{\infty} \times	_ \	Τ.	6	_ \	_		_						112-	5-91	112-	5-9	1	<u> </u>		

Form Number HS 10-2A (12/89)

Los Alamos Los Alamos National Laboratory

RADIOACTIVE SOLID WASTE DISPOSAL RECORD

Los Alamos, New Me			E. Read in	structions on	back caref	ully before	completing th	,	E-7 Waste Ma	nagement
Street	continuat	10~)							Ext. 6095, M	-
2. Date	3. Retrievable		4. Origin	of Waste					5	i. Waste
M M D D Y Y	Serial Numb	er	Group		TA Bu	ilding	Wing	Program	Code -	Code
6. Waste Description										
7. Numbers of Waste Pag				8. Gross \	/olume			9. Package Ra	diation at	
Card- Plastic Board	Drums	Wooden Cr	İ		F = f	neter³)		Surface	1 Mete	
Bags Boxes N	No. Gal.	No. Volur	ne-ft ³	Amount	1 (G = g	allon /		(mr/hr)	(mr/h	r)
			•						•	
10. Gross Weight	11.	Additional De	escription	of Packaging	g and Pack	aging Ma	terials			
$ \begin{array}{c} K = kilog \\ P = poul \\ T = ton \end{array} $	gram)									
Amount										
12. Radionuclide Conter	nt							D-1	SS Materials	Write-Off
Nuclide	Amount	±	(C = curi M = gra	e) Error Amou		1±	Amount A = an M = me E = es	Determined By: lalysis easurement timate	Account	Project Code
	G				. 1					
Rh 106	8+5 7	6 E -	3 C	•		E	E			
56125	4.716	2 E -	2 c	<u> </u>		E	E			
T = 1 2 5	1+917	7 E -	2 C	•		E	E			
B A 1 3 7	1.019	17 E H	ه د	•		E	E			
Pm 147	6.68	E -		1	1 1	E	E			
				_	1 1					
E U 155	24 / 8	8 E -	2 C	•		E	E		<u> </u>	
Waste Generator (Print Nam	ne Herel		HSE-1/-10	APPRO 0/-11 Area Rep	VALS presentative	(Print Name	Here)	Additional Signa	atures (Optiona	11)
Waste Generator () This Your	, , , , , , , , , , , , , , , , , , , ,									
Signature certifies that the that ALL applicable accepts criteria have been met(Signature).	waste is as represe ance and disposal/ ature)	ented here and storage	Signature handle al	e certilies that w ng transport(Sig	vaste packag gnature)	e or shipme	int is sale to			
12 Date	14 Die	posal/Storage	Location					15. Shaft \$	Surface Dose	•
13. Date Disposed	Area	Shaft	Pit	Post(s	3)	Layer	Pos.	mr/h	nr	
M M D D Y / 12 10 5 9		30	5							
HSE-7 Waste Managem	ent Representa	tive (Print Nan	ne Here)				Received A	Logbook	Computer	Verified
Signature pertifies that a	ali (wa)ste receivin	g, nandi ng, ar	na a sposal	/storage requ	uirements w	ere met.	Date	Date	Date	Date
(Signature)	X	1 - 6.					12-5-91	12-5-91		

Los Alamos

Los Alamos National Laboratory Los Alamos, New Mexico 87545

RSWD Form Number	Retrievable Serial Number
s 9 1 2 7 1 7	01/19/5/2/5

NONCERTIFIED TRU WASTE SUPPLEMENTAL DATA SHEET

			Wasie	Gene	rators Package	miormation		- <u> </u>
Organic Material \	Weight (lb.)		1.0	<u>) E</u>	→ / Organic N	faterial Volume (%)	6
	of Shielding				Manuadi			
Туре	Thickness	(in.)	·····		Nonradi	oactive Hazardous	Materials	
None					Name		EPA Code	Quantity (g)
☐ Lead	• E			^	DONE			• E
☐ Steel	• E							• E
☐ Concrete	• E							• E
☐ Other	• E							• E
Internal Pac	ckaging	Additional I	nforma	ition				
Plastic bags		1.1		1-1	-4	1-1-1	1.	1
Number 2		CONTAN	<u>и I Д д</u> /	760	STAINCESS	SPEEC ALP	na cont	AINMENT DOX
Thickness 3 M	116	wrap	ped	/~	plastic	and pack	ed IN	a left x left
□ 90-mil HDPE Lii	nor	X 101	1 5	tee	L box			
Blocking	ner							
Other		WPRF	Re	fere.	vee Numb	er 00538	•	
The waste descri	bed herein was	prepared, pa	ckaged,	and doc	cumented such that it at and complete to the	meets all of the appl	cable requireme	ents of AR 10-5 of the
Printed Name	1	ETTER	I	Signatu		lu	<u>go.</u>	Date 8/9/9/
				SITE	HEALTH PHYS	ICS INFORMA	TION	
Gamma Dose rate (/mrem/h)	18.0) E	+ 2	Survey Meter Mode	R0-30	Property No.	002630
,		i		1				
Neutron Dose Rate	**********	• -		+0	1			005231
Total Dose Rate (mi		8•0		+ 2	Printed Name 1/	/ /	as prescribed ii	Date -/
Alpha contamination	n (dpm/100cm	2) 1•3	<u> E </u>	+ /	Signature	enneth	L Hut	Date 8/9/9/
Beta-Gamma Cont.	(dpm/100cm ²	6.1	Е	+ 2	Olgitature	5. Clu	1	
			111	. HSE	-7 AUTHORIZA	TION	•	
The data packag			viewed	by HSE-	7. The generator is a	uthorized to arrange	transportation	
Printed Name	BRUCE T	REICH		Signatu	ire Dru	ut. aich		Date 8/12/9/
· · · · · · · ·		V. RECEI	VING	SITE	HEALTH PHYSI	CS INFORMAT	ION	
Gamma Dose rate (mrem/h)		E		Survey Meter Mode		Property No.	
Neutron Dose Rate	(mrem/h)	•	E		Survey Meter Mode		Property No.	
Total Dose Rate (mi		•	E		The data in this sec	tion were collected	as prescribed in	n approved procedures.
Alpha contamination		2) •	E	+	Printed Name			Date
Beta-Gamma Cont.	(dpm/100cm ²	1	E	+	Signature			
HS Form Number 10-5	B (11/88)							

LOS Alamos Los Alamos National Laboratory Los Alamos, New Mexico 87545

WASTE PROFILE REQUEST

HSE-8 USE ONLY	
Reference Number	
00538	

Complete both sides of this form using a black or blue pen. Inadequate information will result in processing delays. Send completed form to: ATTN: WPRF, MS K490

N': 1:1 - 10	1	100.00		T	
Division/Group MST-5	Telephone 667-4653	Mail Stop G-742	Technical Area	Building	Room
11171-0	1661-4633	15-142	TA-3	5m-29	W9-9
⊠ Knowledge of P	rocee		☐ Chemical/Physica	Applyage (Speci	f. Polous
MSDS Attached			Request For Analysis		·
Unicos Attached			Neddest For Analysis	L Analy	sis Attached
Choose one or more	of the items below which	best describes	our waste:		
☐ Flammable	Pesticide	Photographic	Spent Cools	ant Plastic	: S
Combustible	Beryllium	Sanitary	Aerosol Car	ns Filter f	Media
High Explosive	Asbestos	Radiochemistr	/ Motor Oil		m Filter Sludge
Oxidizer	Solvent	Paint Waste	Pump Oil	Cemer	
Pyrophoric	☐Weste Rags	Laboratory Tra	= . `		alvageable
Cyanide	Gless	Metallurgic	UST Remed		ecyclabie
Heavy Metal	Plating Solution	Scrap Metal	Soils	□Buildin	•
Corrosive	Etchent	Medical/Biolog		_	Site Debris
Additional Descripti		N MENT	- boxes		
ieneral Description	Of Waste (check at least of	one block for eac	h column):		
FORM	FLASH POINT (°F)	рН	REACTIVITY	PCBs	
Solid	Less Than 100	2.0 or Less	Unstable	☐ < 50 p	pm
Cemented Sludge	☐ 100 to 139	2.1 to 12.4	Reacts Witi	h Water 50-50	0 ppm
Semi-Solid/Sludge	140 to 200	12.5 or Greate	r Cyanides	□>500	ppm
Absorbed Liquid	Greater Than 200	Not Applicable	Sulfides	MNo PC	Bs
Liquid	None		Shock Sens		
Gas	. ~		Class A or	B Explosive	
Multi-Layer			Non-Reactive	v e	
Suspended Solids					
Powder or Ash					
Indicate Known R	adioactivity Of Your Wast	e: List Know	n Radioistopes:		
☐Not Radioactive (Go	To Next Section)	Determine	d By Assay	Determined By Es	timate
T 400 -0/-	57 Alaba	Radiosotope	1.235 W	Activity/Unit of Meas	ure $ u$ A
☐ < 2.0 nC/g ☐ > 2.0 nC/g	⊠Alphe ⊠ Bets		2. 239 Pu	Activity/Unit of Measo	
☐ > 10.0 nC/g	⊠ Gamma	, t		Activity/Unit of Meas	
> 100.0 nC/g	Tritium	1 1		•	75
声 7 100.0 110/g	☐ ''''œ'''	Radiosotope	4. MAP	Activity/Unit of Meas	nte
orm is correct. I unders	FICATION ge of the waste, and/or chemical tand that this information will be ng the possibility of fines and im	made available to re	gulatory agencies and that	provided regarding the there are significant	e waste specified on penalties for submitti
rint Generator's Name (I		Z Num		Signature	Date
EDBETTE	R JAMES 1		7067	edhether	4.27-
your Group's Waste Co	ordinator is the custodian of you tion, provide the name and mail :	eton of this	roup Waste Coordinators		Mail Stop
		Page 1	1 2	Col	mplete Reverse S

	- Blone			KOP	vaste, at the posted	Other
Arsenic			. □≥ 5.0 ppm	21	□>□	_
Berium		< 100.0 ppm	□≥ 100.0 ppm	ញាំ		
Cedmium		1.0 ppm		芾		
Chromium		< 5.0 ppm		र्जी		
Lead		☐ < 8.0 ppm	□≥ 5.0 ppm	iff		7
Mercury		[] <0.2 ppm	≥ 0.2 ppm	芾		
Nickel	TO CO	<134.0 ppm	[]≥ 134.0 ppm	90 0		ä
Selenium	Φ.	☐ < 1.0 ppm	≥ 1.0 ppm	面		
Silver	1	☐ < 5.0 ppm	≥ 5.0 ppm	面	$\overline{\Box} \longrightarrow \overline{\Box}$	ă
Thellium		☐ <130.0 ppm	≥ 130.0 ppm	IV	$\square \longrightarrow \square$	
Organic Comp	ounds (indicate	if the following	organic compou	nds exist in	your waste, at the	posted concentra
Benzene	None		_	КОР	Analysis TCLP	Other
Carbon Tetrac		☐ < 0.5 ppm	≥ 0.5 ppm	<u> 2</u>	□ -	
Chlorobenzen		☐ <0.5 ppm	≥ 0.5 ppm		□> □	
Chloroform	* #	☐ < 100.0 ppm	□ ≥ 100.0 ppm		<u>□</u> >□	
Cresol	. #	☐ < 6.0 ppm	☐ ≥ 6.0 ppm	Ж	<u> </u>	
1,4-Dichlorob	enzene ni	☐ < 200.0 ppm ☐ < 7.5 ppm	☐ ≥ 200.0 ppm ☐ ≥ 7.5 ppm	088888888	<u> </u>	
1,2-Dichloroet		☐ < 0.5 ppm	≥ 7.5 ppm ≥ 0.5 ppm	#	├ > │	
1,1-Dichloroet		☐ < 0.7 ppm	≥ 0.5 ppm ≥ 0.7 ppm	#	☐ ☐	7
2,4-Dinitrotolu		☐ < 0.13 ppm		出	□ <u> </u>	7
Hexachlorober		☐ < 0.13 ppm	☐ ≥ 0.13 ppm	#		
Hexachlorobut	tediene	< 0.5 ppm	≥ 0.5 ppm	#		
Hexachloroeth	iene 🛅	☐ < 3.0 ppm	≥ 3.0 ppm	吊		
Methyl Ethyl K	Cetone 🗍	☐ < 200.0 ppm	□ ≥ 200.0 ppm	##		
Nitrobenzene	面	☐ < 2.0 ppm	≥ 2.0 ppm	帯		
Pentachloroph	7	☐ < 100.0 ppm	□≥ 100.0 ppm	₫		
Pyridine	面	☐ < 5.0 ppm	≥ 5.0 ppm	₫		
Tetrachloroeth	iylene 🛅	☐ < 0.7 ppm	≥ 0.7 ppm	Ħ		
, Trichloroethyle		☐ < 0.5 ppm	☐ > 0.5 ppm	話	`	
2,4,5-Trichlord	phenol []	< 400.0 ppm	□ ≥ 400.0 ppm	<u> </u>	`	ä
2,4,6-Trichlord	phenol []	☐ < 2.0 ppm		<u>a</u>	<u> </u>	ö
Vinyl Chloride	P	☐ < 0.2 ppm	≥ 0.2 ppm	並	□	
CHECK ONE		•				
ī	eredoue como	nts in the waste are		-		
			7	There are no	additional hazardous cor	nstituents in this wast
	Compound Name		Concentration '			Conce
1				5		
				J		
2				6.		
3				7		
l A				8		
4	HS	E-8/HSE-7 US	E ONLY (Do I	lot Write	Below This Line	
4						•
4	CATION				∏ Hazan	dous or Mixed
☐ Non-Redioect	CATION tive, Non-Hazerdous		Radioacti	/8	: : :	
☐ Non-Radioact	CATION tive, Non-Hazerdous ste			ve .evel Radioactiv		szardous Waste
☐ Non-Redioect ☐ Solid Wes ☐ Non-Regu	CATION tive, Non-Hazerdous ste Jated Chemical Wa				/e Waste ☐ H	azardous Waste ixed Low-Level Waste
□ Non-Redioect □ Solid War □ Non-Regu □ Sanitary \	CATION tive, Non-Hezerdous ste ulated Chemical Wa Waste	Sto	Low-l	evel Radioactiv	ve Waste Ha	
□ Non-Redioect □ Solid War □ Non-Regu □ Sanitary \	CATION tive, Non-Hazerdous ste Jated Chemical Wa	Sto	Low-l	.evel Radioactiv uranic Waste	ve Waste Ha	ixed Low-Level Waste
Non-Redioect Solid Wes Non-Regu Sanitary \	CATION tive, Non-Hezerdous ste ulated Chemical Wa Waste n-Disposable Waste	ete •	Low-l	.evel Radioactiv uranic Waste	ve Waste Ha	ixed Low-Level Waste
Non-Redioect Solid Wes Non-Regu Sanitary \	CATION tive, Non-Hazerdous ste slated Chemical Wa Waste n-Disposable Waste Mixed Waste C	ete	□ Low-l ☑ Trans □ Speci	evel Radioactiv uranic Waste al Nuclear Mate	re Waste Ha	ixed Low-Level Waste ixed Transuranic Was
Non-Redioect Solid West Non-Regu Sanitary V Other Nos	CATION tive, Non-Hezerdous ste ulated Chemical Wa Waste n-Disposable Waste	ete •	Low-l	.evel Radioactiv uranic Waste	re Waste Ha	ixed Low-Level Waste ixed Transuranic Was
Non-Redioect Solid West Non-Regu Sanitary V Other Nos	CATION tive, Non-Hazerdous ste slated Chemical Wa Waste n-Disposable Wasts Mixed Waste C Wasts Code 2	ete	□ Low-l ☑ Trans □ Speci Weste Code 4	evel Radioactiv uranic Waste al Nuclear Mate	re Waste Ha	ixed Low-Level Waste ixed Transuranic Was 6 Waste Code

PACKAGING CONDITION INSPECTION

Los Alamos Los Alamos National Laboratory

Waste Package Serial Number

0019525

Los Alamos, New Mexico 87545 I. GENER	RATOR'S P	RE-USE VISUAL INSPECTION					
Drum Lot Code	NA	Inspection Items	Initials				
Year Of Mfgr.	INA	Ring, Bolt, & Nut	N/A				
Box Serial No.	NA	Lid & Gasket	NA				
Comments: Container used For	ر د	Chime	NA				
TRANSportation and stora		Dents	Toph				
At TA-54 AVEA 6' ON	Ly	Gouges	M				
	7	Paint	M				
This container has been visually inspected and has	been found	to be free of damage that would make it unsuitable for TRU waste p	oackaging.				
Name TOBIAS J. ROMERS		Signature Da	ate 8/9/91				
	I. DRIVER'S	S VISUAL INSPECTION					
Inspection Items	Initials	This waste package was visually inspected at time of pickup as required by					
Filter	NA	approved procedures, and was found to be free of obvious damage or					
Labels	pum	defects.					
Damage	pum	Comments					
Closure Ring	NA						
TID Seal No.							
Name Paul W Mont oyo	~	Signature Paul W Montop	ate /4-9/				
		A-54 INSPECTION					
Weight (lbs.)		Till the state of	maga bafasa				
TID Seal No.		This waste package was visually inspected for handling date					
Comments:		shipping, and, if the package is a drum, the closure ring bolt w	as ugntened				
		as required by approved procedures.					
Name		Signature D	ate				
		<u> </u>					

HS Form Number 10-5C (11/88)

Los Alamos National Laboratory Los Alamos. New Mexico 87545

memorandum

TO: Jim Ledbetter, MST-5, MS G742

DATE: May 7, 1991

ate King, HSE-3

MAIL STOP/TELEPHONE: G726/7-4127

SYMBOL: HSE-3:HAZ:91-318

SUBJECT: PACKAGING AND TRANSPORTATION OF ALPHA BOXES

Based upon our meeting of April 29, 1991 and recent changes at the Laboratory regarding transfers of hazardous materials you will be required to follow the guidance indicated below.

- Each steel container must be marked on the outside "Radioactive Material NOS 1. UN2982".
- A Hazardous Materials Transfer Form and a Radioactive Material Transfer Tag 2. must be completed for each container.

A copy of the Radiation Work Permit must be sent to the HAZPACT Section for 3. review and approval. Nut required is Contact Reading is

Arrangements must be made through ES&H S2 for road closure during the 4. transfer.

These actions are necessary because it is not apparent that these alpha boxes can be declared Low Specific Activity. The metal containers are, at best, strong tight packaging, but have not been tested. From the best guess available it would appear that you have a type A quantity of 137Cs and MFP. Therefore, I recommend that you proceed down the pathway laid out by the above steps. I would like to also suggest that the metal boxes be painted with some type of rustproof paint.

NK:icf

xc: W. Bradley, ES&H S2, MS K303

E. Derr HSE-7, MS J592

S. Dalton, HSE-3, MS G726

HAZPACT File (2)

DATE:		7/2/9/	7.				
TO:	_	Ledbetter,	M5T-5		6742		
FROM	: Jua	n C. Corpion, HSI	E-8, MS K490				
SUBJ:	WA	ASTE PROFILE R	EQUEST (W	PΙ	R)		
					ion has reviewed and logo the information you prov		
A. Non	-rad	ioactive/Non-haz	zardous				
	0	Solid waste		3	Non-regulated chemical		
	٥	Sanitary waste		3	Other non-disposable w	aste	the same description
B. Radi	ioact	ive					
		Low-level	Œ	3	Transuranic		
	o	Nuclear Materia	l				
C. Haz	ardo	us or Mixed			;		en e
		Hazardous		J	Mixed low-level	en e	
		Mixed transurar	ic				
							ra simply, mi
valid fo	or on	e year or as long a	as the compo	sit	(s) in your files for at least ion of the waste you have new WPR to HSE-8 and at	characteriz	ed remains the
		ing replaced.			. 44		ing American Tanàna
Attachi	men	t(s)					

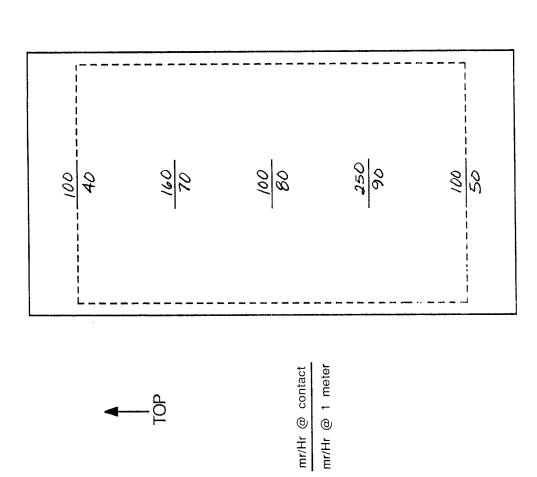
See Reverse Side for Handling Instruction

Page 1 of 4

ORIGINATING LOCATION: TA 03 SM 29 RM Wing 9 CELL 9 DATE 5/7/9 GROUP MST-5 ORIGINATOR J. Ledbatter

200 2/2 200 340 88 BACK 00/ 250 22 22 240 140 mr/Hr @ contact mr/Hr @ 1 meter **10**P alpha box FRONT 120 9 20 3 888

CELL 9

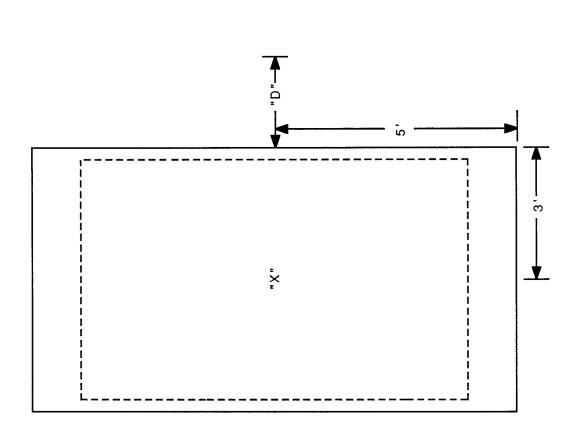


LEFT SIDE

8 800 muths @ contract 90 muther @ (meter

100 60 90 90 110 120 120

RIGHT SIDE



"Q"		X	"X" (mr/Hr)	
(Distance from surface of box)	Front	Back	Left side	Right side
* 10'	74	25	22	58
11.	6/	81	19	20
12,	EI	13	14	£/
13,	//	0/	7/	"
14'	6	8.5	10,5	6
15'	8	2.5	6	8

* Point source readings are taken atthe centerline of the box. The total distance for calculation is 13 feet (4 meters). Backing and doserrate = 0.6 meters.

Instrument PIC-6A

P/N 003113

Calibration Void

Survey By Ross MAKTIMEZ Date 7/8/91.

Page 4 of 4

NARRATIVE CELL 9

Contained within this steel box #9 is a alpha containment box from cell 9 in Wing-9.

The dimensions of the alpha box is $\tilde{}$ 65" x 65" x 8' tall and the gross wt. of the package is 5500 lbs. The weight of the alpha box is approximately 2800 lbs.

The cell 9 alpha box was used for a number of years (8 to 10) as a metallographic sectioning cell. It is the most contaminated and radioactive box that will come out of Wing-9.

Extra care and precautions should be taken when retrieving and introducing into the size reduction facility.

Contaminates are Pu²³⁹, U²³⁵, MFP and MAP. A large amount of the MFP is ¹³⁷Cs. LMFBR fuel has been the only fuel sectioned in this box. Estimated gram weights will be calculated from dose measurements and stated on the radioactive solid waste disposal form (HS 10-2A). The method of calculation is included in the package.

The internal alpha box has been secured in place in a manner to allow easy removal.

- Cut or grind off the lid welds at the 4 corners at the top.
- Remove 4 3/4" hold-down bolts and remove brackets.
- 3. Attach sling at topped holes at 4 corners.
- 4. Hoist the alpha box free.

NOTE: The window of the alpha box is located at the lower front panel.

For further assistance, contact personnel at Wing-9 Hot Cell Facility (74653).

CELL 9 ALPHA BOX

24. 4 21. 4

A. Calculations For Plutonium And URANIUM

23: 40 MBAN 1.41 STD. DEU.

6:057 00 Tome 49 3.498 00 **+/-**

5. 700 00 uzæ(9)
3. 293 00 +/-

1.532 00 TOTAL R.(9) 8.849-01+/-

1.318 00 R 239 (S) 7. 614-01 **+/-**

B,

1.17 004 6 137

1.06938 00**4 5.9**0

1.06938 004 Y 9°

8.5761-03**4 R.¹⁰⁴**

8.5761 -03 **4 RL ****6

4. 7619-02**4 56 125**

1. 9773-024 Te 125m

1.09746 004 Bullin

6.6807-024 **f.** 147

2. 1879-024 En/55

TOTAL FISSION PRODUCT ACTIVITY

4.795082 00**4**

2.7697672 004/-

B. Calculations For Fission Products

- A. Calculations For Plutonium And Uranium
 - 1. Calculate the mean dose-rate value $(\overline{x}1)$ from the four measurements taken along a center-of-box axis at a center-of-box detector distance of 13 feet.
 - 2. Calculate the standard deviation (one sigma) value on the mean value calculated in step 1. Call the standard deviation value Sa. Divide the standard deviation by the mean value and call this error term S1:

$$s1 = \frac{sa}{\overline{x}1}$$

3. Correct the mean value x1 for gamma attenuation through 0.25 inches of steel as follows:

$$\overline{x}2 = \overline{x}1 (1.45)$$

4. Correct x2 value for a worst-case distance (all material located in center-bottom or center-top of box) as follows

$$\overline{x}3 = \overline{x}2 (1.05)$$

5. Convert the final, corrected dose-rate value \overline{x} 3 to grams Pu as follows:

grams
$$Pu = \overline{x}3 (0.043)$$

6. Convert the final, corrected dose-rate value \bar{x} 3 to grams 239 Pu as follows:

grams 239 Pu =
$$\bar{x}$$
3 (0.037)

7. Convert the final corrected dose-rate value \overline{x} 3 to grams U as follows:

grams
$$U = \overline{x}3$$
 (0.17)

8. Convert the final, corrected dose-rate \overline{x} 3 to grams 235 U as follows:

grams 235 U =
$$\overline{x}$$
3 (0.16)

9. Calculate the relative overall measurement uncertainty as follows:

Relative Overall Uncertainty = $\sqrt{0.33 + (S1)^2}$

10. Multiply the Relative Overall Uncertainty value from step 9 times the gram Pu, 239 Pu, U, and 235 (steps 5, 6, 7, and 8) and report as the one sigma value for each element/isotope.

Justifications For Plutonium And Uranium

1. Point Source Model

A series of measurements were conducted to test the assumption that measurement of the dose rate of a 10' x 5' x 5' box using an uncollimated PIC-6 meter located 13 feet from the box centerline (10 feet from the front or rear face) and at the box horizontal axis, is reasonably represented by a point-source model.

The point-source model requires that the observed dose rate is inversely proportional to the square of the center-of-source to detector distance. To test compliance to this requirement, the box dose rate was measured at a 13 foot distance. The box was then rotated 90°, three times, and measurements made on all four faces at the 13 foot distance. Without further box rotation, measurements were taken with one foot increases in the center-of-box to detector distance. At a final distance of 23 feet, the box was again rotated through 90° increments and measurements taken on each face.

The measurement data is presented in Table 1.

Table 1

Dose-Rate Measurements Box #14

PIC-6 Readings	Center-of-box to	Box
mR/hr (net)*	Detector Distance, feet	<u>Orientation</u>
11.4	13	back
10.4	13	l e ft side
9.4	13	front .
11.4	13	right side
9.6	14	right side
8.9	15	right side
7.4	16	right side
6.9	17	right side
6.15	18	right side
5.4	19	right side
5.15	20	right side
4.65	21	right side
3.9	22	right side
3.4	23	right side
3.2	23	back
3.2	23	left side
3.2	23	front

^{*}Background dose-rate = 0.6 mR/hr.

The Table 1 data was analyzed two ways to test the point source (inverse distance squared) model.

Method A. Thirteen and 23 foot distance measurements with box rotation.

Mean values and one sigma uncertainties were calculated on readings taken at box orientations back, left side, front, and right side, both at the 13 and 23 foot distances. Results of these calculations are listed in Table 2

Table 2

Center-of-box	Mean dose-	One standard
Detector distance, feet	Rate, mR/hr	Deviation on Mean
13	10.65	0.96
23	3.25	0.10

To test the mean dose-rate value taken at 13 feet, the 23 foot mean dose-rate value is corrected for distance as follows:

3.25 mR/hr x
$$\frac{(23)^2}{(13)^2}$$
 = 10.17 mR/hr

This value compares with the observed 13 foot value as follows:

2. Attenuation Correction

Spectra taken with a Geruanium detector and Canberra-35 MCA showed a very strong 137 Cs spectra. If other peaks were present, they were not disenable above the 137 Cs gamma peaks plus Compton continuum.

The hot cell gloveboxes has a wall thickness of 0.125 inches (steel) and the boxes housing the gloveboxes was of 0.125 inch wall thickness (steel). Total wall thickness is 0.250 inches (0.635 cm).

Attenuation correction for the 662 Kev, 137/Cs gamma through 0.635 cm of iron is:

$$T = e^{-\mu\rho x} = e^{-(0.0738)(7.86)(0.635)}$$

T = 0.69

A correction factor of $\frac{1}{T}$ = 1.45 is used.

3. Worst-Case Distance Correction

The center-of-box to detector distance assumes the source of the gamma signal is at the very center of the box volume. Since the box was rotated and measurements taken at the four box faces (sides, front, and back), the worst-case location of the gamma source would be at the center of the box top or bottom.

Distance from the detector to the box top or bottom center is 13.34 feet.

A worst-case bias correction for this distance effect is:

Correction =
$$\frac{(13.34^2)}{(13.0)^2}$$
 = 1.05

4. Calibration Constant

Thirty-two cans of scrap representing the reactor fuel specimens handled in the hot cell gloveboxes, were measured for dose-rate with a PIC-6 instrument. Each of these cans had a know weight of fuel material. The attached table column F lists the dose-rates measured (at one meter) for the weight of scrap fuel listed in column I. The dose-rate were divided by the scrap fuel weight for each can and the mean value and one standard deviation for the mean determined. The values are: 67 mR/(hr)(gram), 38 mR/(hr)(gram) one sigma. The RSD is 0.57.

The fuel is of Mixed Oxide composition with the following makeup:

Pu:U ratio = 1:4
Weight fraction Pu = 0.18
Weight fraction 239 Pu = 0.155
Weight fraction = 0.70
Weight fraction 235 U = 0.65
Weight fraction 0 = 0.12

Dividing the weight fraction values for the elements and isotopes above by the nominal 67 mR/(hr)(g) and by 16 (adjusting

the 1 meter can measurement distance to the 4 meter box measurement distance), one obtains the following grams element or isotope per mR/hr constants listed below:

Calibration Constants

Isotope or Element	g Isotope or element per mR/hr
Pu	0.043
239 Pu	0.037
U	0.17
235 U	0.16

Note that the nominal 67 mR/(hr)(g) value is <u>not</u> corrected for attenuation. Attenuation correction for the cans of fuel scrap would be quite difficult because the can contents are very heterogeneous. By not performing attenuation corrections or the can dose-rates, we will <u>overestimate</u> the hot cell box fissile content.

5. Combined Error Terms

Two bias terms, the adjustment for worst-case distance and lack of attenuation correction on cans of fuel scrap, have been intensionally used to <u>overstate</u> the amount of fissile content of the hot-cell boxes. These terms will <u>not</u> be included in the combined error term.

Error terms to be included are for the mR/(hr)(g) factor for deriving calibration factors, the four measurements of the hot cell boxes, and the box attenuation correction. These terms discussed below:

a. Point Source Model.

The uncertainty on the point source model was estimated from the Table 3 data. The one standard deviation of 0.04 on the mean value of 0.99 is a relative error of 0.04.

- b. Calibration Factor
 The one standard deviation value on the mean 67
 mR/(hr)(g), derived from the 32 can measurements, is 38
 mR/(hr)(g). This translates to a relative error of
 0.57.
- c. Four Box Measurements This error term is the one standard deviation on the mean value of the four box face mR/hr measured values. Call this term S1.
- d. Attenuation Correction

 This correction has uncertainties in both the nominal attenuating steel thickness and in the mass attenuation coefficient. Assuming the thickness can vary by 10% and the coefficient has a 20% uncertainty, these error terms introduce relative uncertainties into the mass of element or isotope as follows:
 - i) Thickness relative error = 0.03
 - ii) Attenuation coefficient relative error = 0.07

These uncertainty terms are combined in quadrature as follows:

Overall Uncertainty =
$$\sqrt{(0.04)^2 + (0.57)^2 + (51)^2 + (0.03)^2 + (0.07)^2}$$

Overall Uncertainty = $\sqrt{0.33 + (51)^2}$

The four percent difference from perfect agreement indicates very good agreement with the point-source model.

Method B. <u>Consistency of inverse-distance-squared correct</u> measurements at increased distance.

Eleven mR/hr measurements were performed while increasing the center-of-box to detector distance from 13 to 23 feet in one foot increments. The box remained in the "right side" orientation. Each mR/hr measurement value was "corrected" to the 13 foot distance and the "corrected" values listed in table 3.

Table 3

14-23 Foot mR/hr Values Corrected to 13 feet

Center-of-Box	Net mR/hr	mR/hr corrected	13 ft value
(11.4			
to detector, feet	observed	to 13 ft distance	corrected
value)			
14	9.6	11.1	1.03
15	8.9	11.8	0.97
16	7.4	11.2	1.02
17	6.9	11.8	0.97
18	6.15	11.8	0.97
19	5.4	11.5	0.99
20	5.15	12.2	0.93
21	4.65	12.1	0.94
22	3.9	11.2	1.02
23	3.4	10.6	1.07

Reducing the right-hand column data from Table 3 yields a mean value of 0.99 and a one sigma value of 0.04. All values fell within one sigma except the 23 foot and 20 foot values which were within two sigma and on opposite "sides" of the mean value. This information indicates that the point-source model is appropriate for the 13 foot measurement distance.

B. Calculations for Fission Products

1. Multiply the mean PIC-6 value (\$\overline{x}\$1 from A.1) by 16 to estimate the point-source dose rate at one meter. Divide this value by 1000 to convert to Roentgans per hour at one meter (Rhm).

 $Rhm = (\bar{x}1)(16)/1000$

- 2. Divide the Rhm from B.1 by 0.32 Rhm per Ci to convert to curies Cs-137.
- 3. Using the Ci Cs-137 value from B.2, multiply by the factors below to estimate the remaining fission product activities:

```
Ci Sr-90 = (Ci Cs-137) (0.914)

Ci Y-90 = (Ci Cs-137) (0.914)

Ci Ru-106 = (Ci Cs-137) (0.00733)

Ci Rh-106 = (Ci Cs-137) (0.00733)

Ci Sb-125 = (Ci Cs-137) (0.0407)

Ci Te-125m = (Ci Cs-137) (0.0169)

Ci Ba-137m = (Ci Cs-137) (0.938)

Ci Pm-147 = (Ci Cs-137) (0.0571)

Ci Eu-155 = (Ci Cs-137) (0.0187)
```

4. Calculate the total fission product activity from the Cs-137 activity as follows:

Total Fission Product Activity = (ci Cs-137)/0.244

Justifications For Fission Products

- 1. High-resolution gamma spectroscopy measurements on the hot cell liners showed the peaks and Compton continuum of Cs-137. No other peaks were observed. This observation is reasonable as the irradiated fuel samples examined in these cells had been out-of-reactor greater than 10 years and as the irradiated fuel radiation reaching the PIC-6 instrument was attenuated by 0.25 inches of steel. An assumption was made that the radiation measured with the PIC-6 was due solely to Cs-137.
- 2. Appendix B of report LA-4400 was used to convert the observed dose rates (measured at 4 meters) were multiplied by 16 (distance correction) prior to dividing by 0.32 Rhm per Ci.

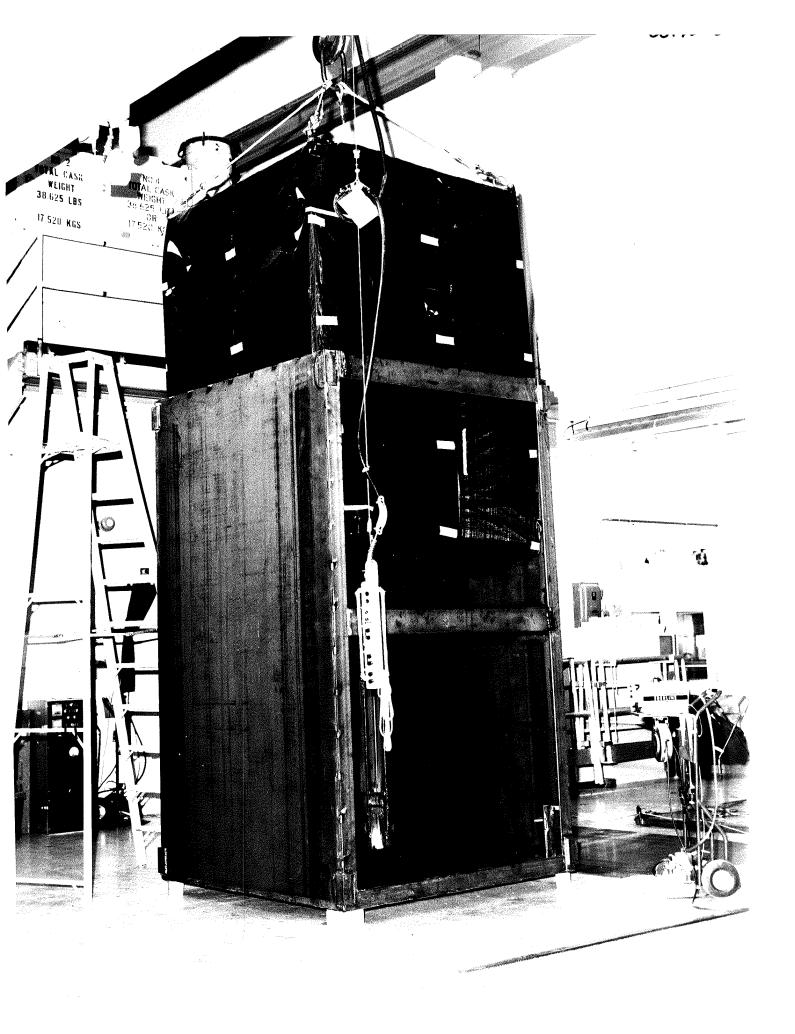
3. Attached tables (Fission Products from U-235) supplied by R. Henderson (HSE-1) were use to estimate the curies associated with fission products other than Cs-137. Fuel residues the alpha boxes are conservatively estimated at 10-years-since-irradiation hence the "Ratio-to-Cs-137", "10 Years" table data was used.

	A	В	С	D	E	F	G	Н	1	J	K	L	М	N	0
1	STEEL	LOGBO		WT.	RADIATIO	ON (R/hr)	ESTIM/	TED (g)	ASSAY	STD.	ASSAY	DRUM	CANISTER	?	STEEL CAN
2	CAN#	No.	PAGE	(Lbs.)	Contact	1 meter	Pu	U	WT. (g)	DEV.	REPORT	No.	No.	?	LOCATION
49	151	23744	48	29	33	1.5	0.1	96	15.6	3.1	4/12/90			FU	CE5E3
50	152	23744	48	41	15	0.3	0.1	145	3.0	0.6	4/12/90			FU	CE5C3
51	159	23744	49	33	300	5	3	6	11.2	2.6	1/11/91			FU	CE416
52	171	23744	50	44	280	2.7	2	8	6.4	1.6	1/11/91			FU	CE4B2-2
53	173	23744	51	38.5	900	6	2	0.4	6.3	1.8	1/11/91			FU	CE4F4-2
54	351	23744	82	32	300	4	8	32	16.7	8.7	9/12/90			RU	CE5A3-2
55	352	23744	82	27	100	1	6	24	22.5	8.7	9/12/90			FU	CE5H6-2
56	353	23744	82	30	150	2	7	30	18.7	8.7	9/12/90			FU	CE5H2-2
57	354	23744	82	27	200	3	7	27	16.2	8.7	9/12/90			FU	CE5G4-2
58	355	23744	83	31	40	1	8	34	21.0	8.7	9/12/90			FU	CE5C3-2
59	356	23744	83	30	40	2	8	32	17.3	8.7	9/12/90			FU	CE5C5-2
60	357	23744	83	30	300	5	6	25	17.0	8.7	9/12/90			FU	CE5C4-2
61	358	23744	83	32	200	3	14	51	27.2	8.8	9/12/90			FU	CE5B4-2
62	360	23744	84	34	65	1	7	30	23.5	8.7	9/13/90			FU	CE5F6-2
63	361	23744	84	28	150	3	8	31	14.9	8.7	9/10/90			FU	CE5F5-2
64	437	23744	107	43	1	0.01	0.1	4	0.82	0.30	2/4/91			ΡU	CE4F9-3
65	123	23744	40	26	35	0.3	11	86	33	9	2/4/91			MS	CE7E9
66	124	23744	38	27	250	2.5	19	71	47	10	1/17/91			MS	CE7F9
67	125	23744	38	29	200	3	18	75	62	10	1/17/91			8	CE4F8-2
68	126	23744	36	27	900	5.5	18	80	64	10	1/17/91			MS	CE4D4-2
69	127	23744	38	28	600	3	18	80	60	10	1/17/91			3	CE4G3-2
70	128	23744	40	27	200	1.5	15	76	48	10	1/17/91			MS	CE4F1-3
71	129	23744	37	26	130	3	19	70	24.3	8.7	11/21/90			MS	CE4C6-2
72	130	23744	36	24	200	6	19	79	34	9	1/17/91			MS	CE4H8
73	131	23744	37	26.5	>1000	10.5	24	75	67	11	1/17/91			MS	CE4A8-2
74	132	23744	37	26	150	3	21	78	41	10	1/25/91			MS	CE7I9
75	133	23744	37	26	100	1.5	20	79	26.9	8.7	11/21/90			MS	CE4B7-2
76	134	23744	36	27	160	2.5	22	74	50	10	2/4/91			MS	CE7C9
77	135	23744	36	27.5	135	2.5	17	74	30.7	8.8	11/21/90			MS	CE415
78	137	23744	38	28	220	3	20	78	46	10	1/17/91			MS	CE4E8-2
79	138	23744	40	28	120	2	34	62	63	11	1/28/91			MS	CE4D8-2
80	139	23744	38	26	250	4	16	81	56	10	1/17/91			MS	CE4G8-2
81	140	23744	36	27	375	2.9	20	80	47	10	1/28/91		<u> </u>	MS	CE411
82	141	23744	40	28	300	3	18	80	54	10	1/25/91	<u> </u>		MS	CE7G9
83	142	23744	40	29	150	2	16	52	51	10	1/17/91	<u> </u>		MS	CE7D9
84	143	23744	39	26	120	2	18	78	36	9	11/21/90	1	<u> </u>	MS	CE4C7-2
85	144	23744	39	27	110	2	19	72	40	10	1/17/91		<u> </u>	MS	CE7H9
86	145	23744	39	27	200	3	14	68	63	10	1/28/91		ļ	MS	CE4A7-2
87	146	23744	39	29	130	4	18	65	27.0	9.1	4/12/90	ļ		MS	CE5D3
88	147	23744	39	29	120	3.5	19	81	53.4	10.6	4/12/90	1	ļ	MS	
89	148	23744	37	29	175	1.5	25	66	22.7	9.0	4/12/90	ļ	ļ	MS	
90	267	23744	65	28	110	5	12	87	76	11	1/17/91	<u> </u>	 	MS	
91	268	23744	65	30	600	7	19	80	76	11	1/17/91			MS	
92	273	23744	66	32	500	5	17	80	76	12	1/25/91			MS	
93	274	23744	66	30	80	1.5	27	63	38	9	1/11/91		<u> </u>	MS	
94		23744	66	29.5	5	1.3	6	91	41	9	1/11/91	ļ	 	MS	
95		23744	67	29	60	1.5	18	70	36	9	1/11/91	-		MS	
96	277	23744	67	31	70	1.5	25	52	34	10	1/28/91		<u> </u>	MS	
97	285	23744	68	28	600	10	59	38	17.4	3.1	10/3/90		 	TH	
98	286	23744	69	27	500	9	84	3	16.7	2.9	10/3/90			TH	
99	287	23744	69	26	500	10	84	5	16.7	2.9	11/21/90			TH	
100	288	23744	69	26	500	9	85	4	17.2	3.0	10/3/90	-	 	TH	
101	289	23744	69	27	400	8	88	24	11.1	1.9	10/1/90		 	TH	
102	290	23744	69	28	500	10	87	23	10.7	1.8	10/1/90			TH	
103		23744	69	29	550	8	86	5	18.7	3.4	11/21/90		 	TH	
104	292	23744	69	26	350	5.5	45	93	14.0	2.5	10/3/90	Щ.,		TH	CE4E3

Prompt Fission Products from U-235 Relative Curies

-	Relative Curies		
Nuclide	7 Years	10 Years	20 Venue
8r-90	9.74E-04	9.09E-04	20 Years
Y-90	9.74E-04	9.09E-04	7.11E-04 7.11E-04
Ru-106	5.76E-05	7.29E-06	7.35E-09
Rh-106	5.76E-05	7.29E-06	7.35E-09
Sb-125	8.75E-05	4.05E-05	7.35E-09 3.11E-06
Te-125m	3.62E-05	1.68E-05	1.29E-06
Cs-137	1.06E-03	9.95E-04	7.87E-04
Ba-137m	9.95E-04	9.33E-04	
Pm-147	8.11E-05	5.68E-05	.7.38E-04
Eu-155	2.49E-05	1.86E-05	2.62E-06
Total	4.35E-03	3.89E-03	1.20E-05 2.97E-03
	Ratio to Cs-137		
Nuclide	7 Years	10 Years	20 Years
Sr-90	91.89%	91.36%	
Y-90	91.89%	91.36%	90.34%
Ru-106	5.43%	0.73%	90.34%
Rh-106	5.43%	0.73%	0.00%
Sb-125	8.25%	4.07%	0.00%
Te-125m	3.42%	1.69%	0.40%
Cs-137	100.00%	100.00%	0.16%
Ba-137m	93.87%	93.77%	100.00%
Pm-147	7.65%	5.71%	93.77%
Eu-155	2.35\$	1.87%	0.33% 1.52%
	Ratio to total listed act	ivity (>95%)	
Nuclide Sr-90	7 Years	10 Years	20 Years
Y-90	22.40%	23.35%	23.97%
Ru-106	22.40%	23.35%	23.97%
Rh-106	1.32%	0.19%	0.00%
Sb-125	1.32%	0.19%	0.00%
	2.01%	1.04%	0.10%
Te-125m Cs-137	0.83%	0.43%	0.04%
Ba-137m	24.38%	25.56%	26.53%
Pm-147	22.88%	23.96%	24.88%
Eu-155	1.87%	1.46%	0.09%
Nuclide	0.57%	0.48%	0.40%
Sr-90	No former		
₩± -3 V	No Gammaa		

Nuclide		0.0/8	
\$r-90 Y-90	No Gammas No Gammas		
Ru-106	.511 Mev	20	*
Rh-106	.622 MeV	10	ł
Sb-125	.430 MeV	30	ŧ
Te-125m	No Gammas	50	•
Cs-137	No Gammas		
Ba-137m	.661 MeV	90	ŧ
Pm-147	.474 MeV	36	*
Eu-155	.086 MeV	30	1
	.105 MeV	20	





Appendix F

TRU Waste Storage Information, Container S910327 Stored in Shaft 306 This page intentionally left blank.



TRU WASTE STORAGE RECORD



S910327

1.	Generator's	Pre-Use	Visual	Inspection
----	-------------	---------	--------	------------

Purchase Order #								ı	nspec	cted It	tems		
This container has l	been visually inspected a be free of damage that wo	ccording	to approved pr	rocedures and		R	ing, Bolt,	and Nut		Chim			ents
packaging.	e nee or damage mat wo	оши ттаке	i ii urisuitabie i	or TRU waste		Li	d and G	asket		Goug	jes	□Р	aint
Printed Name			Si	ignature				Sig. Da	te		0	per. Da	te
2. Generator's P	ackage Information	1											
Group	Technical Area	Buildi	ng	Cost Cent	er		Progra	m Code	Со	st Ac	count	Wor	k Package
LTP-PTS	54		000000										
Additional Infor	mation			DP []	Non-	-DP If	Non-DF	wast	e, atta	ach D0	DE app	roval doc.
							R	adionud	clide C	Conte	nt		
													C= Curie
				Nuclide Am-241				nount			ertain	-	M = Gram C
Container		Liner						E-002			00E+		
Steel Drum (ŭ ,	☑ Nor		Cs-137				E-001			00E+		С
☐ Pipe Overpa	• •		mil liner	Pu-238				E-003			00E+		С
	85 gal Overpack)		mil liner	Pu-239				E-002			00E+		С
Standard Wa		☐ Fiberboard Liner				_		E-002			00E+		С
	ste Box Overpack	Internal Shielding						E-001			00E+		С
	RH Canister		Pu-242				E-006			00E+		С	
Other (Call TWCO) Type Thickness				s Ru-106		İ	4.362	E-003		0.0	00E+	000	С
Filter Serial No.	01						ŀ	łazardo	us Ma	terial	s		
Tintor Gorial Ito	02				Name						EPA Code		Qty (g)
Waste Profile Nu	ımber 5339	3 (WS	ID 3701	7)									
Gross Weight (lb	o.)		5.40E+00)3									
Net Weight (lb.)			3.80E+00)3									
Shipping Catego	ry												
LANL Waste Str	eam ID		TA-03-2	27									
TRUCON Code													
Date Closed (MN				Accumulat							/04/		
The data in this se Printed Name	ction were collected, an	nd waste	described her	ein was package Signature	d a	and la	abeled a	ccording t	o appro		rocedu Date:	ires.	
Fillited Name				Signature							Date.		
3. Generator Site	Health Physics Inf	ormatic	n	•									
	<u> </u>			Survey Date	е	Sur	vey Mete	r Model	Prope	rty Nui	mber	Calibra	tion Void Date
Gamma Dose Rate (mrem/h) (contact)			Survey Date	_	Sun	vey Mete	r Model	Prope	rty Niu	mhar	Calibra	tion Void Date	
Neutron Dose Ra	ate (mrem/h) (contac	t)		Survey Date	<u>-</u>	Suiv	vey iviete	i wodei	Поре	ity ivui	TIDEI	Calibra	lion void Date
Total Dose Rate	(mrem/h) (contact)								•		l.		
Total Dose Rate	(mrem/h) (1 meter)			The data in			ction wer	e collecte	ed acco	rding t	o appr	•	ocedures.
Alpha Contamina	ation (dpm/100cm2)			Printed Nan	ne	1						Date	
Beta-Gamma Co	ont (dpm/100 cm2)			Signature									



TRU WASTE STORAGE RECORD

Printed Name



Date:

4. TRU Waste Management Review/Authorization

The data package for this waste has been reviewed. Basedon the information provided, this waste meets the WAC requirements for storage at TA-54.			Printed Name Date: Signature						
E Dual and Viewal In	ti								
This waste package waccording to approved labeling requirements	ras visually inspecte I procedures. It mee	ts WAC pack	aging and	Printed Name Date:					
defects.									
6. Receiving Site H	ealth Physics Inf	ormation		-					
Gamma Dose Rate (mrem/h) (contact)				Survey D		Survey Meter Mo		operty Number	Calibration Void Date
Neutron Dose Rate	(mrem/h) (contac	t)		Survey D	ate	Survey Meter Mo	del Pro	operty Number	Calibration Void Date
Total Dose Rate (mrem/h) (contact)									
Total Dose Rate (m	rem/h) (1 meter)					is section were col	lected ac	ccording to app	proved procedures.
Alpha Contamination (dpm/100cm2)			Printed Name Date					Date	
Beta-Gamma Cont (dpm/100 cm2)			Signature						
7. Storage Site Info	rmation								
Received by (Initials)		Date Receiv	red	Original Storage Data					a
This waste package w					Buil	ding Number	Layer		Row Number
and in good condition. procedures.	It was accepted an	d inspected a	eccording to a	approved	Colu	umn Number	1	Date Stac	cked (MM/DD/YY)
Printed Name			Date:		Printed Name			Date:	
Signature				Signature					
8. Waste Acceptant	ce Office								
Intials/Date				W	/E De	escription			
NCR Number	Intials/Date					NCR Descri	otion		



TRU WASTE STORAGE RECORD



9. Continuation Sheet for Radionuclide Content (from Page 1, Section 2)

Radionuclide Content - Continued						
Nuclide Sr-90	Amount 5.438E-001	Uncertainty	C= Curie M = Gram C			
U-234	1.998E-004	0.000E+000	С			
U-235	6.237E-006	0.000E+000	С			
U-236	8.225E-007	0.000E+000	С			
U-238	5.766E-008	0.000E+000	С			
Y-90	5.438E-001	0.000E+000	С			
	1	'	ı			

10. Continuation Sheet for Hazardous Materials (from Page 1, Section 2)

Hazardous Materials					
Name	EPA Code	Qty (g)			
No Additional Hazardous Materials					



S910327 T-TTRU-TEMP

Status:

WS ID: 37017 C ID: 769769 Opt ID: B19336 ACTIVE

ACTIVE

SC: Shield cask

04-Dec-1991

Remotely handled canister

04-Dec-1991 12:00 am

NO

GENERAL INFORMATION

Decommissioned:

Container Subtype:

Accum Start Date:

Container Type:

Origin Date:

Closed Date:

Container ID: 769769 **Labeled ID:** S910327

Optional ID: B19336

Chemical Barcode:

Physical State: SOLID
Waste Stream ID: 37017

Work Path: T-TTRU-TEMP

Quantity (Univ):

Compactible:

Discard Matrix:

TID(s):

Gen Contact:

Insert By:

Waste Desc:

WCATS APPLICATION (000000)

GENERATED AT 03-00029

WEIGHTS AND VOLUMES

Container Volume: 10.20 CM Gross Weight: 5400.93 lb

Waste Volume: NOT SPECIFIED Tare Weight: 1600.00 lb

Net Weight: 3800.93 lb

LOCATION

Pickup (Origin): LANL: 03-CMR: GEN-AREAS

Current: LANL: 54-G-DISP: SHAFT306



CONTAINER PROFILE S910327 T-TTRU-TEMP

WS ID: 37017 C ID: 769769 Opt ID: B19336 ACTIVE

PAYLOAD INFORMATION

Container Procurement

P.O. Number: Year of Manuf:

Lot No.: Serial No:

Solution Package: 53: SP BG - Hot Cell Liners

TRUCON Code:

Shipping Category:

CCP AK Report:

WIPP Waste Stream: TA-03-27: COMBINED COMBUSTIBLE AND NONCOMBUSTIBLE

Matrix Code:

Defense Waste: Equiv. Comb. Matrix:

Adeq. Ventilation: Compliant Metal Cont.: YES

Overpack (1 to 1): NO Retrievable: BIR WS Code: LA-RM14

Content Code:

	COST CODES						
Cost Center	Prog Code	Cost Account	Work Package	Percent Allocation	Cost Center Status	Cost Code Status	Recharge Mode
	X77A			100.00			SELECTION LIST

		EPA CODES
System	Hazardous	
Code	Waste No.	Waste Description & Treatment Subcategory



CONTAINER PROFILE \$910327 T-TTRU-TEMP

WS ID: 37017 C ID: 769769 Opt ID: B19336 ACTIVE

	RADIONUCLIDES						
Nuclide	Amount	Unit	Uncert	MT Derived (Y/N)	Activated (Y/N) MDA Result (Y/N)	Normal Form (Y/N)	Measurement Code/Comment
Status: Activ	ve, Assay Page:	338173,	Date: 12/04/199	1, Deri	vation: Generato	r Ente	red Results (e.g., Offsite Assay)
38	3.10E+000	g	0.00E+000	N			NONE
55	7.80E-001	g	0.00E+000	N			NONE
Am-241	2.41E-002	Ci	0.00E+000	Y		Y	
Cs-137	5.95E-001	Ci	0.00E+000	N		Y	
Pu-238	8.02E-003	Ci	0.00E+000	Y		Y	
Pu-239	4.06E-002	Ci	0.00E+000	Y		Y	
Pu-240	2.61E-002	Ci	0.00E+000	Y		Y	
Pu-241	8.31E-001	Ci	0.00E+000	Y		Y	
Pu-242	9.35E-006	Ci	0.00E+000	Y		Y	
Ru-106	4.36E-003	Ci	0.00E+000	N		Y	
Sr-90	5.44E-001	Ci	0.00E+000	N		Y	
U-234	2.00E-004	Ci	0.00E+000	Y		Y	
U-235	6.24E-006	Ci	0.00E+000	Y		Y	
U-236	8.23E-007	Ci	0.00E+000	Y		Y	
U-238	5.77E-008	Ci	0.00E+000	Y		Y	
Y-90	5.44E-001	Ci	0.00E+000	N		Y	



S910327 T-TTRU-TEMP

WS ID: 37017 C ID: 769769 Opt ID: B19336 ACTIVE

RAD CALCULATIONS

Total Activity (nCi/g): 1.51788E+03 DOTFissile Mat (g): 3.54724E+00

Alpha (nCi/g): 5.74585E+01 Transport Index:

TRU Alpha (nCi/g): 5.73267E+01 NRC Class: C

Pu-239 FGE: 2.53015E+00 **DOT Type:** B

Pu-239 FGE [2U]: 2.53015E+00 **LSA-I Fraction:** 1.23536E+02 N

Pu-239 Eq-Ci: 1.16303E-01 **LSA-II Fraction:** 2.51857E-02 Y

Pu-239 Eq-Ci [2U]: 1.16303E-01 **LSA-III Fraction:** 1.25928E-03 Y

TRU Pu-239 Eq-Ci: 1.14814E-01 **Reportable Quantity:** 1.68083E+01 Y

TRU Pu-239 Eq-Ci [2U]: 1.14814E-01 * **ALC Ratio:** 5.95897E+06 NE

Decay Heat [U] (W): 7.52086E-03 * **ACM Ratio:** 3.70609E+03 NE

Tritium (Ci/m3): 0.00000E+00 Limited Quantity: 4.34219E+03 N

Weight/Volume Used:

TRU ECW PE-Ci:

1 Container Net Weight: 1.72407E+03 kg *ALC (Activity Limit for Exempt Consignment)
2 Container Volume: 1.01950E+01 m3 *ACM (Activity Concentration for Exempt Material)

U = 1 Uncertainty, 2U = 2 Uncertainty

		TASK HISTORY	
Date/ Time	Task ID/ Status	Task Name/ Storage or Disposal Grid Location	Reject
12/05/1991 12:00 AM	1784398 EXECUTED	LANL:03-CMR » 54-G-DISP:SHAFT306	NO

Note: Highlighted row indicates container was output or receiving container for the indicated task

DOCUMENTATION

1.14814E-01

Doc. Number Title Uploaded By

I S910327-TWSR WCATS APPLICATION

(000000)

(000000)

COMMENTS

Date Time/
User Name Comment

08/23/2013 9:37 AM CELL 14 STEEL ALPHA BOX IN STEEL BOX PUT IN RH SHAFT WPRF# 00538

WCATS APPLICATION (000000)

EDIT LOG

Date Time/ Quality

User Name Record Explanation



CONTAINER PROFILE \$910327 T-TTRU-TEMP

WS ID: 37017 C ID: 769769 Opt ID: B19336 ACTIVE

		EDIT LOG
Date Time/ User Name	Quality Record	Explanation
08/23/2013 9:45 PM WCATS APPLICATION (000000)	NO	TRUP.TRUPKG TABLE (WASTEDB): [PKG_ID] = S910327, [ALPHA_CONT] = , [APPROVE_BY] = , [APPROVE_DATE] = , [BETA_GAMMA_CONT] = , [BLDG_CD] = 03-00029, [BX_SERIAL] = , [CERT_STATUS] = , [COLOR_CD] = , [COMMENTS] = CELL 14 STEEL ALPHA BOX IN STEEL BOX PUT IN RH SHAFT WPRF# 00538, [CONTENT_CODE] = , [CONTROL] = , [DATE_CLOSED] = , [GAMMA_DOSE] = , [GROSS_WT] = 5400.927, [GRP] = MST5, [NEUTRON_DOSE] = , [NORMAL] = , [OLDDRUMNUM] = B19336, [OLDVOL_UNIT] = F, [OLDWT_UNIT] = T, [ORG_VOL] = , [ORG_WT] = , [PKG_CD] = 04, [PKG_CD_DESC] = REMOTELY HANDLED CANISTER, [PKG_DATE] = 1991-12-05 00:00:00, [PKG_FISS_GRAMS] = 2.52130142757035818727189771001266944809, [PKG_LOT] = , [PKG_PE_ACT] = . 114944864584257720278265233849531573254, [PKG_TARE_WT] = 1600, [PKG_VOLUME] = 10.195, [PROC_BTCH_CD] = , [PROG_CODE] = X77A, [ROOM] = X77A, [SAMPLE_ID] = , [THERMAL] = .00747985298473232893473084191695248158, [TOTAL_DOSE] = 650, [TOT_ANCG] = 57.5776197399805070596235488378904971752, [TRUCON_CD] = , [WASTE_CD] = 52, [WPRF_CD] = , [YR_MFG] = , [WASTE_TYPE] = , [INSP_DATE] = , [AUA_VUA] = , [PROCESS_ID] = , [WGEN_CD] = , [DOT_TYPE] = , [BIR_ID] = LATR05, [RQ] = , [LSA_SCO_CD] = , [LSA] = , [A_START_DATE] = , [BIR_WS] = LA-RM14, [LA_WS] = TA-03-27, [SWBOP] = , [RETRIEVABLE] = , [OFFSITE] = , [LINER_CD] = , [INVENTORY_NO] = , [INVENTORY_DT] = , [CHCD_CC_CD] = , [CHCD_CA_CD] = , [CHCD_WP_CD] = , [DOT_DP] = , [WASTE_VERIF] = , [VERIF_COMPLETE] = , [HDL_CD] = , [UPD_WHEN] = 2004-07-02 12:08:37, [UPD_WHO] = 114644, [PHY_STATE] = S, [PKG_H3_ACT] = 0, [QTW] = N, [AK_REPORT] = , [STP] = 0
08/23/2013 12:33 PM WCATS APPLICATION (000000)	NO	TRUP.UPD_HISTORY TABLE: [UPD_ID]= 12684, [AUTH_BY]= 113199 -> CHRISTENSEN DAVIS V , [AUTH_NUM]= SR318, [PKG_ID]= S910327, [UPD_WHEN]= 03-26-1996, [UPD_WHO]= Z111142 -> LONGLEY JOHN M , [WHAT]= tgrams, tcuries, fiss_grams, thermal, pkg_pe_act,pkg_fiss_grams, [WHY]= Correct errors
08/23/2013 8:48 AM WCATS APPLICATION (000000)	NO	INITWORKPATH (C_ID=769769/PATH_ID=465): SKIPPED (NO WORKPATH UNITS)

Los Alamos

Los Alamos National Laboratory Los Alamos, New Mexico 87545

RADIOACTIVE SOLID WASTE DISPOSAL RECORD

NOTE: Read instructions on back carefully before completing this form.

1. Form Number						HSE-7 Waste M	/lanagement
s 9 1 Q327						Ext. 6095, N	MS J592
2. Date	3. Retrievable	4. Origin of W	/aste				5. Waste
M M D D Y Y	Serial Number	Group	TA	Building	Wing	Program Code	Code
080991	0119336	MISIT	5 3	2	9 9	X17171A	A 141
6. Waste Description							
CELL 14	STAINL	ESS.	STEE	ALP	HA BO	X P A C	KED
7. Numbers of Waste Pa	ckages	8.	. Gross Volume		9. Pac	kage Radiation at	7247 %-4
Card- Plastic Board	Drums Wooden		 F	1 = meter ³)	Surfac		
Bags Boxes	No. Gal. No. Vo	lume-ft ³	Amount \(\mathbb{G}\)	i = gallon /	(mr/h	r) (mr/	hr)
			600 F	!		50.	50
	11 Additional			ackaging Materia			
10. Gross Weight (K = kild P = pour		PSULE AHA			10		
Amount $P = pot T = ton$. <i>1</i> 11	TEEL				RF 00	161218
	1 1 1 3	1 2 6 6			W P		220
247 T							
12. Radionuclide Conte	nt			***************************************			als Write-Off
		(C = curie M = gram)	Error on		Amount Determi A = analysis	ned By:	Project
Nuclide	Amount ±	(M = gram)	Amount	±	M = measurem E = estimate	ent Account	Code
					C - Catimate		
U3 8	34/ E+	0 M	1+8	E + 0	A		
PU155	748 E -	11 m	465	E - 1	A		
C 5 / 3 7	5+9 15 E-	1/6	•	E	E		
5 R 9 0	544 3 8 E -	1 C	. •	E	E		
Y 9 0	5 4 13 18 E -	1 c	•	E	E		
RU106	4.3 6 2 6-	3 C	•	E	E		
			PPROVALS				
Waste Generator (Print Nar	me Here)			live (Print Name Here) Additio	onal Signatures (Option	nal)
Jim LE	OBETTER	Kenn	neth 1	Aut	<u> </u>		
Signature certifies that the	waste is as represented here and	Signature certi	fies that waste pac nsport(Signature)	kage or shipment is s	ale to		
cheria nave been met(Sign	ance and disposal/storage pature)	K	·aul	-			
12.5	14. Disposal/Stora	ne Location			15	i. Shaft Surface Do	se
13. Date Disposed			Post(s)	Layer	Pos.	mr/hr	-
M M D D Y	Y		1	Layor	- 33		
112101519		6				<u> </u>	
HSE-7 Waste Managen	nent Representative (Print No	ame Here)		Rec	eived Logboo	ok Compute	r Verified
Signature cortified that	ANDREW J. CATA all waste receiving, Manching.	IVACH and disposal/stor	age requiremen			Date	Date
(Signature)	× C-		<i></i>	12-	591 12-5	5-91	
Form Number HS 10-2A (12	(/89)						

Los Alamos

RADIOACTIVE SOLID WASTE DISPOSAL RECORD

Los Alamos National Laboratory	RADIOACTIVE SOLID WAS TE DISPOSAL RECORD
	NOTE: Read instructions on back carefully before completing this form.

1. Form Number 0327 Cont	HSE-7 Waste Mar WNい4す/0ル Ext. 6095, MS					HSE-7 Waste Mana Ext. 6095, MS J	1
s 9 1 4 4 5 1 3					<u> </u>		
L. Date	rievable	4. Origin of Wa					Waste Code
M M D D Y Y	ial Number	Group	TA Buildi	ing	Wing Prog	ram Code	,oue
6. Waste Description							
7. Numbers of Waste Packages			Gross Volume		9. Package	Radiation at	
Card- Dru Plastic Board		11	$ \begin{pmatrix} M = me \\ F = foo \end{pmatrix} $	†3 \	Surface (mr/hr)	1 Meter (mr/hr)	
Bags Boxes No.	Gal. No. Vol	ume-ft ³	Amount \(\mathbb{G} = \text{gall} \)	ion /	(11117111)	(0117111)	
					1 1 1	,] , ,	, ,]
• • • • • • •	<u> </u>	<u> </u>	<u> </u>			<u> </u>	
10. Gross Weight	11. Additional	Description of Pa	ckaging and Packag	ing Materials			
Amount $\begin{pmatrix} K = kilogram \\ P = pound \\ T = ton \end{pmatrix}$							
7 - 1011 /							
12. Radionuclide Content						SS Materials V	Vrite-Off
12. Radionuciide Content							
	. 1.	(C = curie (M = gram)	Error on		A = analysis M = measurement	Account	Project
Nuclide Am	nount ±		Amount	± \(\)	E = estimate /		Code
	2			E E			
RL 1064	3 6 2 5 -	3 C	•	E	_		
561252	41212 8-	20	•	E <i>E</i>	-		
TE 125 /+	0106 6-	2 0	•	E	-		
m							
BA11375	5 8 1 E -	11 0	•	E E	-		
Pm1473	3 19 17 E-	2 C	•	E E			
		2 C	1 1 1	E <i>E</i>	_		
E 0 1 5 5 1+	1 1 3 -	2	<u> </u>			1	
		A	PPROVALS	int Mana Hara	Additional C	ignatures (Optional)	
Waste Generator (Print Name Here)		HSE-1/-10/-11 /	Area Representative (Pr	int Name Here)	Additional S	ignatures (Optional)	
	horo and	Signature certifi	ies that waste package o	r shipment is safe	to		
Signature certifies that the waste is that ALL applicable acceptance and criteria have been met(Signature)	as represented here and d disposal/storage	handle and tran	nsport(Signature)	, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			
citiena have been metrogradio.						· · ·	
[40 P-4	14. Disposal/Stora	ne Location			15. Sh	aft Surface Dose	
13. Date Disposed			Post(s)	Layer Po		nr/hr	
M M D D Y Y		1 1 1	1	1 1 1			
1205191	G 30	611					

MADREW J. CATANACH Signature certifies that all waste receiving handling, and disposal/storage requirements were met. Date Date Date Date 12-5-91 (Signature)

Received

Logbook

Computer

Verified

Form Number HS 10-2A (12/89)

HSE-7 Waste Management Representative (Print Name Here)

Los Alamos

Los Alamos National Laboratory Los Alamos, New Mexico 87545

RSWD	Retrievable			
Form Number	Serial Number			
s 19 1 10 3 2 17	0119336			

NONCERTIFIED TRU WASTE SUPPLEMENTAL DATA SHEET

I. Waste Generator's Package Information

Organic Material Weight (lb.)				1.0	E	÷ /	Organic M	aterial Volume	e (%)					10
Internal Shielding			_	Nonredioactive Herendous Metadolo										
Туре	Thicknes	s (in.)		Nonradioactive Hazardous Materials										
X None				Name					EPA Code			Quantity (g)		
☐ Lead	• E			None								• E		
☐ Steel	• E											•	Εĺ	
☐ Concrete	_ • E											•	E	
☐ Other	• E											•	le l	ĺ
Internal Pa	ckaging	Addi	tional Inf	ormati	on									
Plastic bags Number Thickness	1 3 mil	Con	Hamin appec	4	~ p	LASTIC LASTIC	<u>and</u>	eel alpi packed	hn d	con Na	Hain G	inen ft x	t bo	* */
90-mil HDPE L Blocking Other The waste descri				Refe	renc	و ما	ımber	00538	applica	nble reau	uireme	nts of AR	10-5 of ti	he
Los Alamos Hea				ata a(e	correc	t and con								
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		II. GE	NERA	TOR	SITE	HEAL?	H PHYSI	CS INFORM	ITAN	ON				
Gamma Dose rate	(mrem/h)		6.5	E	12	Survey	Meter Mode	1 RO-3C		Property	No.	0026	630	
Neutron Dose Rate	(mrem/h)		• +	E	40	Survey	Meter Model	PNR-4		Property	No.	005	23/	
Total Dose Rate (m	rem/h)		6.5	E	r 2	The da	a in this sec	tion were collec				approve		ures.
Alpha contamination	n (dpm/100cr	_n 2 ₎	1.5	E -	. 1	Printed	Name K	mets	1	Aul	4	Date 8	19/91	
Beta-Gamma Cont	. (dpm/100cm	2)	3 • 8	Е .	· 2	Signatu	re <u>K</u>	- Cli	Q.		,		7	
				III.	HSE	-7 AUT	HORIZAT	rion -	/					-
The data packa	ge for this was	te has b	been revie	wed b	y HSE-	7. The ge	enerator is au	ıthorized to arra	ange tr	ansporta	ation to	o TA-54.		
Printed Name	BRUCE T.	REICH	Ы	S	ignatu	re	Dru	wy Ka	en	L		Date 8	/12/	91
		IV. R	ECEIVI	NG S	SITE	HEALT	H PHYSIC	CS INFORM	IATIO	ON				
Gamma Dose rate	(mrem/h)		•	E		Survey	Meter Model		F	roperty	No.			
Neutron Dose Rate	(mrem/h)		•	E		Survey	Meter Model		F	roperty	No.			
Total Dose Rate (m	rem/h)		•	E		The da	a in this sec	tion were collec	ted as	prescri	bed in	approved	d proced	ures.
Alpha contaminatio	n (dpm/100cn	_n 2)	•	Е -		Printed	Name					Date		
Beta-Gamma Cont.			•	E +	.	Signatu	re							
HS Form Number 10-5			•											·

Los Alamos, New Mexico 87545

WASTE PROFILE REQUEST

HSE-8 USE ONLY
Reference Number
00538

Complete both sides of this form using a black or blue pen. Inadequate information will result in processing delays.

Send completed form	n to: ATTN: WPRP, MS K4	- 3 0					
Division/Group	Telephone	Mail Stop G-742	Technical Area	Building	Room		
MST-5	667-4653	0-742	TA-3	5m-29	wq-9		
⊠Knowledge of P	rocess	٢	Chamical/Physical	l Angleson (Co.	-16 D.I.		
MSDS Attached	100633	•	☐ Chemical/Physical ☐ Request For Analysis		•		
		L	Director Con Milanyore	<u> </u>	lysis Attached		
Choose one or more	of the items below which	best describes yo	our waste:				
☐ Flammable	Pesticide	Photographic	Spent Coola	nt Plas	tics		
Combustible	Beryllium	Senitary	Aerosol Can		r Media		
High Explosive	Asbestos	Radiochemistry	☐ Motor Oil		□ Vacuum Filter Sludge		
Oxidizer	Solvent	Paint Waste	Pump Oil	☐ Cerr	Cement Paste		
Pyrophoric	☐Weste Rags	Laboratory Trasi			☐ Non-Salvageable		
Cyanide	Glass	Metallurgic	UST Remedi	iation Non	-Recyclable		
Heavy Metal	Pleting Solution	Scrap Metal	Soils	☐ Build	ling Debris		
Corrosive	sive Etchant		el Environment	al Firin	g Site Debris		
	PHA CONTAI	NMENT					
General Description (FORM	Of Waste (check at least of FLASH POINT (°F)			202			
FURIM	PLASH PUINT (F)	рН	REACTIVITY	PCBs			
Solid	Less Than 100	☐ 2.0 or Less	Unstable	□ <50) ppm		
Cemented Sludge	☐ 100 to 139	2.1 to 12.4	Reacts With	Water 50-	500 ppm		
Semi-Solid/Sludge	140 to 200	12.5 or Greater	☐ Cyanides	<u></u> >50	X) ppm		
Absorbed Liquid	Greater Than 200	Not Applicable	Sulfides	⊠ No I	PCBs		
Liquid	None		Shock Sensi	tive			
Gas			Class A or B	Explosive			
Multi-Layer			Mon-Reactiv	•			
Suspended Solids							
Powder or Ash							
Indicate Known Ra	dioactivity Of Your Waste	List Known	Radioistopes:				
☐Not Radioactive (Go	•	Determined (-	Determined By	Estimata		
	TO HORE GOODING	Radiosotope 1	_				
☐ < 2.0 nC/g	⊠ Alphe			Activity/Unit of Med			
☐ > 2.0 nC/g	⊠ Beta	1 1		Activity/Unit of Me	sure		
☐ > 10.0 nC/g	Gamma	Radiosotope 3	MEP	Activity/Unit of Med	sure		
☑>100.0 nC/g	Tritium	Radiosotope 4	MAP	Activity/Unit of Mea	esure		
form is correct. I underst	FICATION of the waste, and/or chemical/pand that this information will be right the possibility of fines and implies.	nade available to regu	llatory agencies and that	provided regarding there are significan	the waste specified on to		
Print Generator's Name (L	ast, First Mi)	Z Numbe	Generator's	Signature	Date		
LEDBETTE	e JAMES N	1. 077	1067	Sheth	4.27-		
	ordinator is the custodian of your	weste Print Gro	oup Waste Coordinators N	lame (Last, First M	Mail Stop		
management documentati	on, provide the name and mail st	op of this	,	- //	一位		
person (optional).		6A	RCIA DA	RyLL	G POL		
Form 1346 (4/91)		Page 1 of		<u>, c</u>	omplete Reverse Sid		

から を

Heavy Metals (indica	ate whethe	r the following h	neavy metals e	xist in yo	our waste, at t	he posted conc	entratio::.):
	None	•		KOP		TCLP Oth	
Arsenic	; 2] < 5.0 ppm	□≥ 5.0 ppm	2		→□ □	
Barium		☐ < 100.0 ppm	☐≥ 100.0 ppm		<u> </u>	-> □ □	
Cadmium		☐ < 1.0 ppm	☐≥ 1.0 ppm	而	<u> </u>	→ ⊓	
Chromium	and in] < 5.0 ppm	□≥ 5.0 ppm	币	<u> </u>	→ □ □	
Lead	i do] < 5.0 ppm	□ ≥ 5.0 ppm	芾		<u>→</u> □ □	
Mercury		<0.2 ppm	☐ ≥ 0.2 ppm	9088888	ă		
Nickel	क्ता क	☐ <134.0 ppm	□≥ 134.0 ppm	芾	<u> </u>	—>□	
Selenium	Ti i	< 1.0 ppm	□≥ 1.0 ppm	#		—>□	
Silver] < 5.0 ppm	☐ ≥ 5.0 ppm	#	H_	<u>→</u> □ □	
Thallium	11.] <130.0 ppm	☐≥ 130.0 ppm	<u> </u>	=		
Organic Compounds					—— □ st in vour wast	→□ □	f concentration):
,	None			KOF		TCLP Oth	
Benzene	ा द्वि] < 0.5 ppm	<u> </u>	Ø		→ □ □	
Carbon Tetrachloride	Fin i	<0.5 ppm	≥ 0.5 ppm	<u></u>	H	→ □ =	
Chlorobenzene	ਜੋ	< 100.0 ppm	□≥ 100.0 ppm	出	H		
Chloroform	# i	☐ < 6.0 ppm	≥ 6.0 ppm	出			
Cresol	# # ;	☐ < 200.0 ppm		##		→ □ □	
1,4-Dichlorobenzene	# #	_ < 2.5 ppm	☐ ≥ 200.0 ppm ☐ ≥ 7.5 ppm	#	<u> </u>	-> □ □	
1,2-Dichloroethane		_		出	<u> </u>	-> □ □	
] < 0.5 ppm	☐ ≥ 0.5 ppm	및	Ц—	-> □ □	
1,1-Dichloroethylene		☐ < 0.7 ppm	☐ ≥ 0.7 ppm	里	Ц—	->	
2,4-Dinitrotoluene] < 0.13 ppm	□ ≥ 0.13 ppm	300888888888888888	<u> </u>		
Hexachlorobenzene		_ < 0.13 ppm	≥ 0.13 ppm	Ψ	□	> ∐ ⊔	
Hexachlorobutadiene		< 0.5 ppm	≥ 0.5 ppm	Ψ	□	-> □ □	
Hexachloroethane] < 3.0 ppm	≥ 3.0 ppm	Φ	□—	→□ □	
Methyl Ethyl Ketone		☐ < 200.0 ppm		Ф		→ □ □	
Nitrobenzene] < 2.0 ppm	≥ 2.0 ppm	由	□—	-> □ □	
Pentachlorophenol	and the contract of	< 100.0 ppm	☐ ≥ 100.0 ppm	面	<u> </u>	-> □ □	
Pyridine	की ते	< 5.0 ppm	☐ > 5.0 ppm	Tī.	Ē	-> ⊓ ⊓	
Tetrachioroethylene	र्ज ति	< 0.7 ppm	□ > 0.7 ppm	币		\rightarrow \Box	
Trichloroethylene	т тт т	< 0.5 ppm	☐ > 0.5 ppm	盂	H	<u>→</u> □ □	
2,4,5-Trichlorophenol	# # #	☐ < 400.0 ppm	☐ ≥ 400.0 ppm	岩			
2,4,6-Trichlorophenol	# #] < 2.0 ppm	≥ 2.0 ppm	ᇽ	<u> </u>	-> L -	
Vinyl Chloride	:] < 0.2 ppm	☐ ≥ 0.2 ppm	냶		-> ∐	
	ும் ப	_ < 0.2 pp	□ ≥ o.z ppm	نعا			
CHECK ONE							
Additional hazardou	s component	s in the waste are li	sted below:	There a	ire no additional h	azardous constituer	nts in this waste.
Compo	und Name	C	oncentration				Concentration
•				_			
1.				5			
2.				6.			
				· · ·			
3				7			
_							
4			-	8			
	HSE	-8/HSE-7 US	E ONLY (Do	Not W	rite Below T	his Line)	
WASTE CLASSIFICATION							
Non-Radioactive, No			Radioac	n ti na		- Unanadava a	n Adivad
Solid Waste			_		diagotius Mares	Hazardous o	
☐ Non-Regulated C	hamiaal Ma	•			dioactive Waste	Hazardo	
	NOTINGEN VV 881	10		nsuranic W			w-Level Waste
Senitary Waste			∐Spe	cial Nuclea	ar Material	<u></u> Mixed Tr	ransuranic Waste
Other Non-Dispo	sable Waste						•
Hazardous or Mixed	i Wasta Ca	dification					
	e Code 2	Weste Code 3	Waste Code	4 W	este Code 5	Waste Code 6	Waste Code 7
HSE-8 Reviewer's Signatu		•		Date /	Cost Cente	or/ProgramCode For	HSE Analysis Backet
House	si)			7/11	91		
				/-/-/-	<u> </u>		

Page 2 of /2

DATE:		1/2/9/			
TO:	<u> </u>	Ledbetter, MST-	5,	6742	edito a grandamento I
FROM	: Jua	n C. Corpion, HSE-8, MS K4	190		
	,				
SUBJ:	WA	ASTE PROFILE REQUEST	(WP	R)	
				gradien in de parker en bezonder bereicht. George	an alle etti ili. Allege
				tion has reviewed and logged the inforn the information you provided, your v	•
•				, and your processing your	,
A. Nor	-rad	ioactive/Non-hazardous			And the second second
	o	Solid waste	σ	Non-regulated chemical	i katalog a sa
		Sanitary waste		Other non-disposable waste	
B. Radi	ioact	ive			
	0	Low-level	Œ	Transuranic	e en en en en en en en en en en en en en
	0	Nuclear Material			
C. Haz	ardo	us or Mixed			Talenta (Sec.)
	0	Hazardous	0	Mixed low-level	
	0	Mixed transuranic			eri de la companya de la companya de la companya de la companya de la companya de la companya de la companya d La companya de la companya de
valid for same.	or on Shou	e year or as long as the com	posi	R(s) in your files for at least 3 years. The tion of the waste you have characterized new WPR to HSE-8 and attach a copy	ed remains the
Attach	men	t(s)			

See Reverse Side for Handling Instruction

Los Alamos National Laboratory Los Alamos, New Mexico 87545

memorandum

TO: Jim Ledbetter, MST-5, MS G742

DATE: May 7, 1991

MAIL STOP/TELEPHONE: G726/7-4127

SYMBOL: HSE-3:HAZ:91-318

SUBJECT: PACKAGING AND TRANSPORTATION OF ALPHA BOXES

Based upon our meeting of April 29, 1991 and recent changes at the Laboratory regarding transfers of hazardous materials you will be required to follow the guidance indicated below.

- Each steel container must be marked on the outside "Radioactive Material NOS 1. UN2982".
- A Hazardous Materials Transfer Form and a Radioactive Material Transfer Tag 2. must be completed for each container.

A copy of the Radiation Work Permit must be sent to the HAZPACT Section for 3. review and approval. Nut required in Contact Leading is \(\) \(

4. transfer.

These actions are necessary because it is not apparent that these alpha boxes can be declared Low Specific Activity. The metal containers are, at best, strong tight packaging, but have not been tested. From the best guess available it would appear that you have a type A quantity of 137Cs and MFP. Therefore, I recommend that you proceed down the pathway laid out by the above steps. I would like to also suggest that the metal boxes be painted with some type of rustproof paint.

NK:icf

xc: W. Bradley, ES&H S2, MS K303 E. Derr HSE-7, MS J592 S. Dalton, HSE-3, MS G726

HAZPACT File (2)

PACKAGING CONDITION INSPECTION

Los Alamos Los Alamos National Laboratory

Waste Package **Serial Number**

0010236

Los Alamos, New Mexico 87545 I. GEI	NERATOR'S P	RE-USE VISUAL INSPECTION	20/9336
Drum Lot Code	NA	Inspection Items	Initials
Year Of Mfgr.	I N/A	Ring, Bolt, & Nut	NA
Box Serial No.	N/A	Lid & Gasket	N/A
Comments: CONTAINER USED F	Gr '	Chime	NA
1 / 1	tornae	Dents	M
ATA-SY Aven G'	ماله	Gouges	The
		Paint	-de
This container has been visually inspected and t	has been found	to be free of damage that would make it unsuita	able for TRU waste packaging.
Name		Signature	Date /g/g/
TOBIAS J KOMERO		Jan Jan Jan Jan Jan Jan Jan Jan Jan Jan	
	II. DRIVER'S	S VISUAL INSPECTIÓN	
Inspection Items	Initials	This waste package was visually inspected	
Filter	NA	approved procedures, and was found to	be free of obvious damage or
Labels	pum	defects.	
Damage	Pwm	Comments	
Closure Ring	NA		
TID Seal No. N A			
Name Paul W Montoy		Signature Paul W Mons	Date 8-14-91
1001 11 11/00/09		E4 INCRECTION	
	III. IA	A-54 INSPECTION	
Weight (lbs.)		This waste package was visually inspect	ted for handling damage before
TID Seal No.		shipping, and, if the package is a drum, the	e closure ring bolt was tightened
Comments:		as required by approved procedures.	
			Date
Name		Signature	Date

HS Form Number 10-5C (11/88)

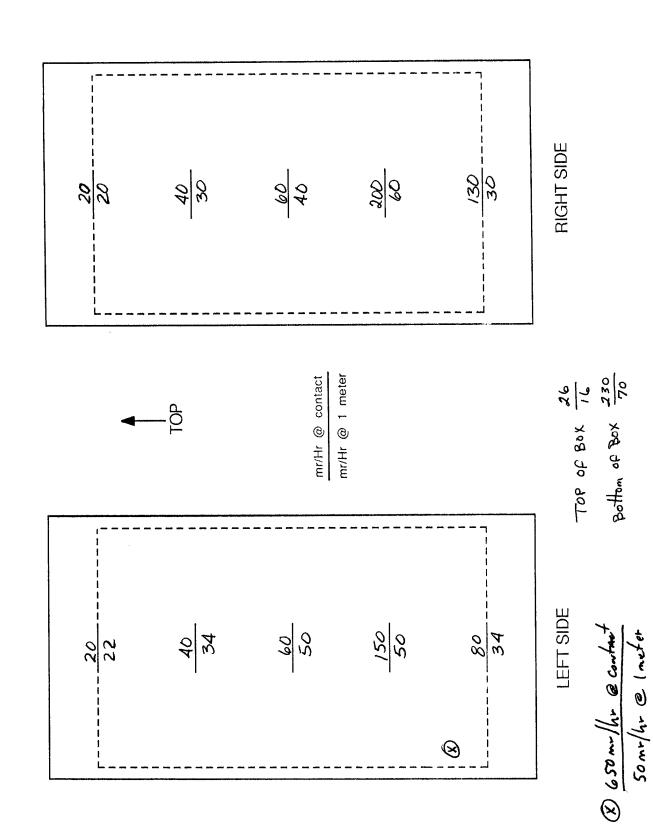
Page 1 of 4

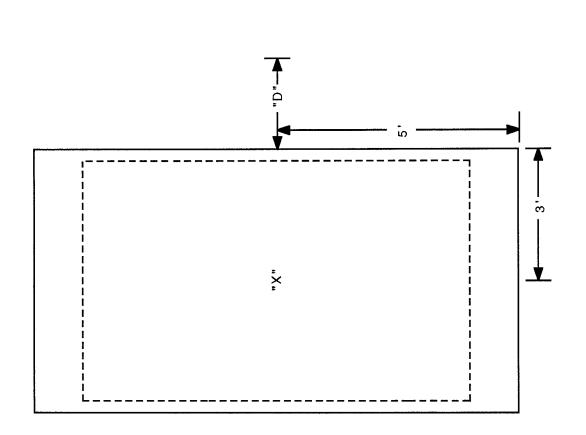
SM 39 RM Wing 9 CELL 14 ORIGINATING LOCATION: TA <u>03</u>

DATE 6/19/91 GROUP MST- 14 ORIGINATOR J. LEDBETTER

9

က





	Right side	14	6	5%	3.5	2.5	7
"X" (mr/Hr)	Left side	12	9	5	4.5	3,5	3.0
, *	Back	77	8	5	5%	3.5	2,5
	Front	12	В	4.5	Z	2.5	7
"D" (Distance from	surface of box)	* 10'	11'	12,	13'	14'	15'

* Point source readings are taken atthe centerline of the box. The total distance for calculation is 13 feet (4 meters). Sackground descenate = 0.6 mk/h.

P/N 003//3 Instrument P/c -64

Calibration Void 8/1/9/

Survey By M.R. LOPEZ, MST-S Date 7/9/91
T. RomeRg MST-S

Page 4 of 4

NARRATIVE CELL 14

Contained within steel box #14 is cell 14 alpha box from Wing-9 of the CMR Building. The dimensions of the alpha box is $65" \times 65" \times 8"$ tall.

The gross weight of box #14 is 5300 lbs. The alpha box weight is 2550 lbs.

The box was installed 12 to 14 years ago as a wet chemistry cell. It served that purpose until ~ 1986, when it was used to package and characterize RH/TRU waste. It has been decontaminated remotely as well as possible. All loose equipment has been removed and all ports have been secured by plywood or metal plates. It was removed from service and packaged in June 1991.

The main contaminants are U^{235} , Pu^{239} , mixed fission products, and mixed activation products.

Estimates of gram weight shown on the RSWD form are calculated from measurements taken at 4 meters. A procedure for the calculation is included in this package.

The internal alpha box has been secured in a manner for easy removal. The lid has been welded at the 4 corners. Cut or grind the corners free and remove the lid. Remove the 4 bolts holding the brackets to the alpha box out. Attach a sling and 4 lifting eyes to the corner brackets. Exercise caution when removing the internal box to prevent striking the viewing window. It is located at the lower front side of the storage box. The storage box is labeled "front".

If further assistance is required contact the Wing-9 personnel in the CMR Building at 7-4653.

CELL 14 ALPHA BOX

A. 11.4 README
11.4 README
11.4 README
11.4 README
11.4 README

A. CALCULATIONS FOR PLUTONIUM AND URANIUM

B. calculations FOR

Fission Products

11.90 MEAN 1.00 STD. DEV.

3.080 00**18111.49** 1.788 00**1/**-

2.899 00**4235 (9)** 1.683 00 **+/-**

7. 791-017074 h.(g) 4. 523-01 +/-

6.704-01**m²¹⁹(y** 3.892-01**#-**

B,

5. 95-01**4 6.137**

5. 4383-01**4** 5. 90

5.4383-01**4 Y***

4.36135-03**6 Ru¹⁰⁶**

4.36135-03**G Rk¹⁰⁶**

2. 42165-02**4 Sb¹²⁵**

1.00555-02**G Te¹²⁶**

5. 5811-014 6 137m

3.39745-02**4 % ¹⁴⁷**

1.11265-02**4 Eu¹⁵⁵**

TOTAL FISSION PRODUCT ACTIVITY

2.4385246 00 **c** 1.4157345 00 **//**-

- A. Calculations For Plutonium And Uranium
 - 1. Calculate the mean dose-rate value $(\overline{x}1)$ from the four measurements taken along a center-of-box axis at a center-of-box detector distance of 13 feet.
 - 2. Calculate the standard deviation (one sigma) value on the mean value calculated in step 1. Call the standard deviation value Sa. Divide the standard deviation by the mean value and call this error term S1:

$$s1 = \frac{sa}{\overline{x}1}$$

3. Correct the mean value x1 for gamma attenuation through 0.25 inches of steel as follows:

$$\overline{x}2 = \overline{x}1 (1.45)$$

4. Correct x2 value for a worst-case distance (all material located in center-bottom or center-top of box) as follows

$$\overline{x}3 = \overline{x}2 (1.05)$$

5. Convert the final, corrected dose-rate value $\overline{x}3$ to grams Pu as follows:

grams
$$Pu = \overline{x}3 (0.043)$$

6. Convert the final, corrected dose-rate value \bar{x} 3 to grams 239 Pu as follows:

grams 239 Pu =
$$\bar{x}$$
3 (0.037)

7. Convert the final corrected dose-rate value $\overline{\mathbf{x}}$ 3 to grams U as follows:

grams
$$U = \overline{x}3$$
 (0.17)

8. Convert the final, corrected dose-rate $\overline{x}3$ to grams 235 U as follows:

grams 235
$$U = \overline{x}3$$
 (0.16)

9. Calculate the relative overall measurement uncertainty as follows:

Relative Overall Uncertainty = $\sqrt{0.33 + (S1)^2}$

10. Multiply the Relative Overall Uncertainty value from step 9 times the gram Pu, 239 Pu, U, and 235 (steps 5, 6, 7, and 8) and report as the one sigma value for each element/isotope.

Justifications For Plutonium And Uranium

1. Point Source Model

A series of measurements were conducted to test the assumption that measurement of the dose rate of a 10' x 5' x 5' box using an uncollimated PIC-6 meter located 13 feet from the box centerline (10 feet from the front or rear face) and at the box horizontal axis, is reasonably represented by a point-source model.

The point-source model requires that the observed dose rate is inversely proportional to the square of the center-of-source to detector distance. To test compliance to this requirement, the box dose rate was measured at a 13 foot distance. The box was then rotated 90°, three times, and measurements made on all four faces at the 13 foot distance. Without further box rotation, measurements were taken with one foot increases in the center-of-box to detector distance. At a final distance of 23 feet, the box was again rotated through 90° increments and measurements taken on each face.

The measurement data is presented in Table 1.

Table 1

Dose-Rate Measurements Box #14

PIC-6 Readings	Center-of-box to <pre>Detector Distance, feet</pre>	Box Orientation
mR/hr (net)* 11.4	13	<u>back</u>
10.4	13	left side
	13	front
9.4		
11.4	13	right side
9.6	14	right side
8.9	15	right side
7.4	16	right side
6.9	17	right side
6.15	18	right side
5.4	19	right side
5.15	20	right side
4.65	21	right side
3.9	22	right side
3.4	23	right side
3.2	23	back
3.2	23	left side
3.2	23	front

^{*}Background dose-rate = 0.6 mR/hr.

The Table 1 data was analyzed two ways to test the point source (inverse distance squared) model.

Method A. Thirteen and 23 foot distance measurements with box rotation.

Mean values and one sigma uncertainties were calculated on readings taken at box orientations back, left side, front, and right side, both at the 13 and 23 foot distances. Results of these calculations are listed in Table 2

Table 2

Center-of-box	Mean dose-	One standard		
Detector distance, feet	Rate, mR/hr	Deviation on Mean		
13	10.65	0.96		
23	3.25	0.10		

To test the mean dose-rate value taken at 13 feet, the 23 foot mean dose-rate value is corrected for distance as follows:

3.25 mR/hr x
$$\frac{(23)^2}{(13)^2}$$
 = 10.17 mR/hr

This value compares with the observed 13 foot value as follows:

2. Attenuation Correction

Spectra taken with a Geruanium detector and Canberra-35 MCA showed a very strong 137 Cs spectra. If other peaks were present, they were not disenable above the 137 Cs gamma peaks plus Compton continuum.

The hot cell gloveboxes has a wall thickness of 0.125 inches (steel) and the boxes housing the gloveboxes was of 0.125 inch wall thickness (steel). Total wall thickness is 0.250 inches (0.635 cm).

Attenuation correction for the 662 Kev, 137/Cs gamma through 0.635 cm of iron is:

$$T = e^{-\mu\rho X} = e^{-(0.0738)(7.86)(0.635)}$$

 $T = 0.69$

A correction factor of $\frac{1}{T}$ = 1.45 is used.

3. Worst-Case Distance Correction

The center-of-box to detector distance assumes the source of the gamma signal is at the very center of the box volume. Since the box was rotated and measurements taken at the four box faces (sides, front, and back), the worst-case location of the gamma source would be at the center of the box top or bottom.

Distance from the detector to the box top or bottom center is 13.34 feet.

A worst-case bias correction for this distance effect is: $Correction = \frac{(13.34^{2})}{(13.0)^{2}} = 1.05$

4. Calibration Constant

Thirty-two cans of scrap representing the reactor fuel specimens handled in the hot cell gloveboxes, were measured for dose-rate with a PIC-6 instrument. Each of these cans had a know weight of fuel material. The attached table column F lists the dose-rates measured (at one meter) for the weight of scrap fuel listed in column I. The dose-rate were divided by the scrap fuel weight for each can and the mean value and one standard deviation for the mean determined. The values are: 67 mR/(hr)(gram), 38 mR/(hr)(gram) one sigma. The RSD is 0.57.

The fuel is of Mixed Oxide composition with the following makeup:

Pu:U ratio = 1:4
Weight fraction Pu = 0.18
Weight fraction 239 Pu = 0.155
Weight fraction = 0.70
Weight fraction 235 U = 0.65
Weight fraction 0 = 0.12

Dividing the weight fraction values for the elements and isotopes above by the nominal 67 mR/(hr)(g) and by 16 (adjusting

the 1 meter can measurement distance to the 4 meter box measurement distance), one obtains the following grams element or isotope per mR/hr constants listed below:

Calibration Constants

Isotope or Element	<pre>q Isotope or element per mR/hr</pre>
Pu	0.043
239 Pu	0.037
U	0.17
235 U	0.16

Note that the nominal 67 mR/(hr)(g) value is <u>not</u> corrected for attenuation. Attenuation correction for the cans of fuel scrap would be quite difficult because the can contents are very heterogeneous. By not performing attenuation corrections or the can dose-rates, we will <u>overestimate</u> the hot cell box fissile content.

5. Combined Error Terms

Two bias terms, the adjustment for worst-case distance and lack of attenuation correction on cans of fuel scrap, have been intensionally used to <u>overstate</u> the amount of fissile content of the hot-cell boxes. These terms will <u>not</u> be included in the combined error term.

Error terms to be included are for the mR/(hr)(g) factor for deriving calibration factors, the four measurements of the hot cell boxes, and the box attenuation correction. These terms discussed below:

a. Point Source Model.

The uncertainty on the point source model was estimated from the Table 3 data. The one standard deviation of 0.04 on the mean value of 0.99 is a relative error of 0.04.

- b. Calibration Factor
 The one standard deviation value on the mean 67
 mR/(hr)(g), derived from the 32 can measurements, is 38
 mR/(hr)(g). This translates to a relative error of
 0.57.
- c. Four Box Measurements This error term is the one standard deviation on the mean value of the four box face mR/hr measured values. Call this term S1.
- d. Attenuation Correction

 This correction has uncertainties in both the nominal attenuating steel thickness and in the mass attenuation coefficient. Assuming the thickness can vary by 10% and the coefficient has a 20% uncertainty, these error terms introduce relative uncertainties into the mass of element or isotope as follows:
 - i) Thickness relative error = 0.03
 - ii) Attenuation coefficient relative error = 0.07

These uncertainty terms are combined in quadrature as follows:

Overall Uncertainty =
$$\sqrt{(0.04)^2 + (0.57)^2 + (51)^2 + (0.03)^2 + (0.07)^2}$$

Overall Uncertainty = $\sqrt{0.33 + (51)^2}$

The four percent difference from perfect agreement indicates very good agreement with the point-source model.

Method B. <u>Consistency of inverse-distance-squared correct</u> measurements at increased distance.

Eleven mR/hr measurements were performed while increasing the center-of-box to detector distance from 13 to 23 feet in one foot increments. The box remained in the "right side" orientation. Each mR/hr measurement value was "corrected" to the 13 foot distance and the "corrected" values listed in table 3.

Table 3

14-23 Foot mR/hr Values Corrected to 13 feet

Center-of-Box	Net mR/hr	mR/hr corrected	13 ft value
(11.4			
to detector, feet	observed	to 13 ft distance	corrected
value)			
14	9.6	11.1	1.03
15	8.9	11.8	0.97
16	7.4	11.2	1.02
17	6.9	11.8	0.97
18	6.15	11.8	0.97
19	5.4	11.5	0.99
20	5.15	12.2	0.93
21	4.65	12.1	0.94
22	3.9	11.2	1.02
23	3.4	10.6	1.07

Reducing the right-hand column data from Table 3 yields a mean value of 0.99 and a one sigma value of 0.04. All values fell within one sigma except the 23 foot and 20 foot values which were within two sigma and on opposite "sides" of the mean value. This information indicates that the point-source model is appropriate for the 13 foot measurement distance.

B. Calculations for Fission Products

1. Multiply the mean PIC-6 value (x1 from A.1) by 16 to estimate the point-source dose rate at one meter. Divide this value by 1000 to convert to Roentgans per hour at one meter (Rhm).

Rhm = $(\bar{x}1)(16)/1000$

- 2. Divide the Rhm from B.1 by 0.32 Rhm per Ci to convert to curies Cs-137.
- 3. Using the Ci Cs-137 value from B.2, multiply by the factors below to estimate the remaining fission product activities:

```
Ci Sr-90 = (Ci Cs-137) (0.914)

Ci Y-90 = (Ci Cs-137) (0.914)

Ci Ru-106 = (Ci Cs-137) (0.00733)

Ci Rh-106 = (Ci Cs-137) (0.00733)

Ci Sb-125 = (Ci Cs-137) (0.0407)

Ci Te-125m = (Ci Cs-137) (0.0169)

Ci Ba-137m = (Ci Cs-137) (0.938)

Ci Pm-147 = (Ci Cs-137) (0.0571)

Ci Eu-155 = (Ci Cs-137) (0.0187)
```

4. Calculate the total fission product activity from the Cs-137 activity as follows:

Total Fission Product Activity = (ci Cs-137)/0.244

Justifications For Fission Products

- 1. High-resolution gamma spectroscopy measurements on the hot cell liners showed the peaks and Compton continuum of Cs-137. No other peaks were observed. This observation is reasonable as the irradiated fuel samples examined in these cells had been out-of-reactor greater than 10 years and as the irradiated fuel radiation reaching the PIC-6 instrument was attenuated by 0.25 inches of steel. An assumption was made that the radiation measured with the PIC-6 was due solely to Cs-137.
- 2. Appendix B of report LA-4400 was used to convert the observed dose rates (measured at 4 meters) were multiplied by 16 (distance correction) prior to dividing by 0.32 Rhm per Ci.

3. Attached tables (Fission Products from U-235) supplied by R. Henderson (HSE-1) were use to estimate the curies associated with fission products other than Cs-137. Fuel residues the alpha boxes are conservatively estimated at 10-years-since-irradiation hence the "Ratio-to-Cs-137", "10 Years" table data was used.

	Α	В	С	D	E	F	G	Н	ı	J	К	L	М	N	0
1	STEEL	LOGBO		WT.	RADIATI	ON (R/hr)	ESTIM/	TED (g)	ASSAY	STD.	ASSAY	DRUM	CANISTER	?	STEEL CAN
2	CAN#	No.	PAGE	(Lbs.)	Contact	1 meter	·Pu	U	WT. (g)	DEV.	REPORT	No.	No.	?	LOCATION
49	151	23744	48	29	33	1.5	0.1	96	15.6	3.1	4/12/90			PJ.	CE5E3
50	152	23744	48	41	15	0.3	0.1	145	3.0	0.6	4/12/90			FU	CE5C3
51	159	23744	49	33	300	5	3	6	11.2	2.6	1/11/91			FU	CE416
52	171	23744	50	44	280	2.7	2	8	6.4	1.6	1/11/91			FU	CE4B2-2
53	173	23744	51	38.5	900	6	2	0.4	6.3	1.8	1/11/91			FU	CE4F4-2
54	351	23744	82	32	300	4	8	32	16.7	8.7	9/12/90			FU	CE5A3-2
55	352	23744	82	27	100	1	6	24	22.5	8.7	9/12/90			FU	CE5H6-2
56	353	23744	82	30	150	2	7	30	18.7	8.7	9/12/90	<u> </u>		FU	CE5H2-2
57	354	23744	82	27	200	3	7	27	16.2	8.7	9/12/90			FU	CE5G4-2
58	355	23744	83	31	40	1	8	34	21.0	8.7	9/12/90	├		FU	CE5C3-2
59	356	23744	83	30	40	2	8	32	17.3	8.7	9/12/90	ļ		FU	CE5C5-2
60	357	23744	83	30	300	5	6	25	17.0	8.7	9/12/90	 		FU FU	CE5C4-2
61	358	23744	83	32	200	3	14	51	27.2	8.8	9/12/90	 		FU	CE5B4-2 CE5F6-2
62	360	23744	84	34	65	1	7	30	23.5	8.7	9/13/90 9/10/90			FU	CE5F5-2
63	361	23744	84	28	150	3	8	31	14.9	8.7		-		FU	CE4F9-3
64	437	23744	107	43	1 05	0.01	0.1	4	0.82	0.30	2/4/91	-	 	25	CE4F9-3 CE7E9
65	123	23744	40	26	35	0.3	11	86	33	9 10	1/17/91	 		MS	CE7E9
66	124	23744	38	27	250	2.5	19	71	47		1/17/91	 	 	MS	CE/F9 CE4F8-2
67	125	23744	38	29	200	3 5 5	18	75 80	62 64	10	1/17/91			MS	CE4P6-2
68	126	23744	36	27	900	5.5	18		60	10	1/17/91			MS	CE4G3-2
69	127	23744	38	28	600	3	18	80 76	48	10	1/17/91			MS	CE4F1-3
70	128	23744	40	27	200	1.5	19	70	24.3	8.7	11/21/90	 	 	MS	CE4C6-2
71	129	23744	37	26	130	6	19	79	34	9	1/17/91	 		MS	CE4H8
72	130	23744	36	24	200	10.5	24	75	67	11	1/17/91	 		MS	CE4A8-2
73	131	23744	37	26.5	>1000 150	3	21	78	41	10	1/25/91	 	1	MS	CE7I9
74	132	23744	37	26 26	100	1.5	20	79	26.9	8.7	11/21/90	1		MS	CE4B7-2
75	133	23744	37	27	160	2.5	22	74	50	10	2/4/91	†		MS	CE7C9
76	134		36	27.5	135	2.5	17	74	30.7	8.8	11/21/90			MS	CE415
77	135	23744	38	28	220	3	20	78	46	10	1/17/91			MS	CE4E8-2
78	138	23744	40	28	120	2	34	62	63	11	1/28/91	1		MS	CE4D8-2
80	139	23744	38	26	250	4	16	81	56	10	1/17/91			MS	CE4G8-2
81	140	23744	36	27	375	2.9	20	80	47	10	1/28/91			MS	CE411
82	141	23744	40	28	300	3	18	80	54	10	1/25/91			MS	CE7G9
83	142	23744	40	29	150	2	16	52	51	10	1/17/91			MS	CE7D9
84	143	23744	39	26	120	2	18	78	36	9	11/21/90)		MS	CE4C7-2
85	144	23744	39	27	110	2	19	72	40	10	1/17/91	T		MS	CE7H9
86	145	23744	39	27	200	3	14	68	63	10	1/28/91	<u> </u>		MS	CE4A7-2
87	146	23744	39	29	130	4	18	65	27.0	9.1	4/12/90			MS	CE5D3
88		23744		29	120	3.5	19	81	53.4		4/12/90		<u></u>	MS	
89		23744	37	29	175	1.5	25	66	22.7	9.0	4/12/90		<u> </u>	MS	
90		23744	65	28	110	5	12	87	76	11	1/17/91			MS	
91	268	23744	65	30	600	7	19	80	76	11	1/17/91	ļ		MS	
92		23744	66	32	500	5	17	80	76	12	1/25/91			MS	
93		23744	66	30	80	1.5	27	63	38	9	1/11/91			MS	
94	275	23744	66	29.5	5	1.3	6	91	41	9	1/11/91			MS	
95		23744	67	29	60	1.5	18	70	36	9	1/11/91		 	MS	
96		23744	67	31	70	1.5	25	52	34	10	1/28/91		-	MS	
97		23744	68	28	600	10	59	38	17.4	3.1	10/3/90		<u> </u>	TH	
98	286	23744	69	27	500	9	84	3	16.7	2.9	10/3/90		-	TH	
99		23744	69	26	500	10	84	5	16.7	2.9	11/21/90		-	TH	
100	288	23744	69	26	500	9	85	4	17.2	3.0	10/3/90		1	TH	
10		23744		27	400	8	88	24	11.1	1.9	10/1/90		-	TH	
102	2 290	23744		28	500	10	87	23	10.7	1.8	10/1/90			TH	
10:	291	23744	69	29	550	8	86	5	18.7	3.4	11/21/90		 	퓼	
104	292	23744	69	26	350	5.5	45	93	14.0	2.5	10/3/90			TH	CE4E3

Prompt Fission Products from U-235 Relative Curies

Nuclide 8r-90 Y-90 Ru-106 Rh-106 Sb-125 Te-125m Cs-137 Ba-137m Pm-147 Eu-155 Total	7 Years 9.74E-04 9.74E-04 5.76E-05 5.76E-05 8.75E-05 3.62E-05 1.06E-03 9.95E-04 8.11E-05 2.49E-05 4.35E-03	10 Years 9.09E-04 9.09E-04 7.29E-06 7.29E-06 4.05E-05 1.68E-05 9.95E-04 9.33E-04 5.68E-05 1.86E-05	20 Years 7.11E-04 7.11E-04 7.35E-09 7.35E-09 3.11E-06 1.29E-06 7.87E-04 7.38E-04 2.62E-06 1.20E-05 2.97E-03
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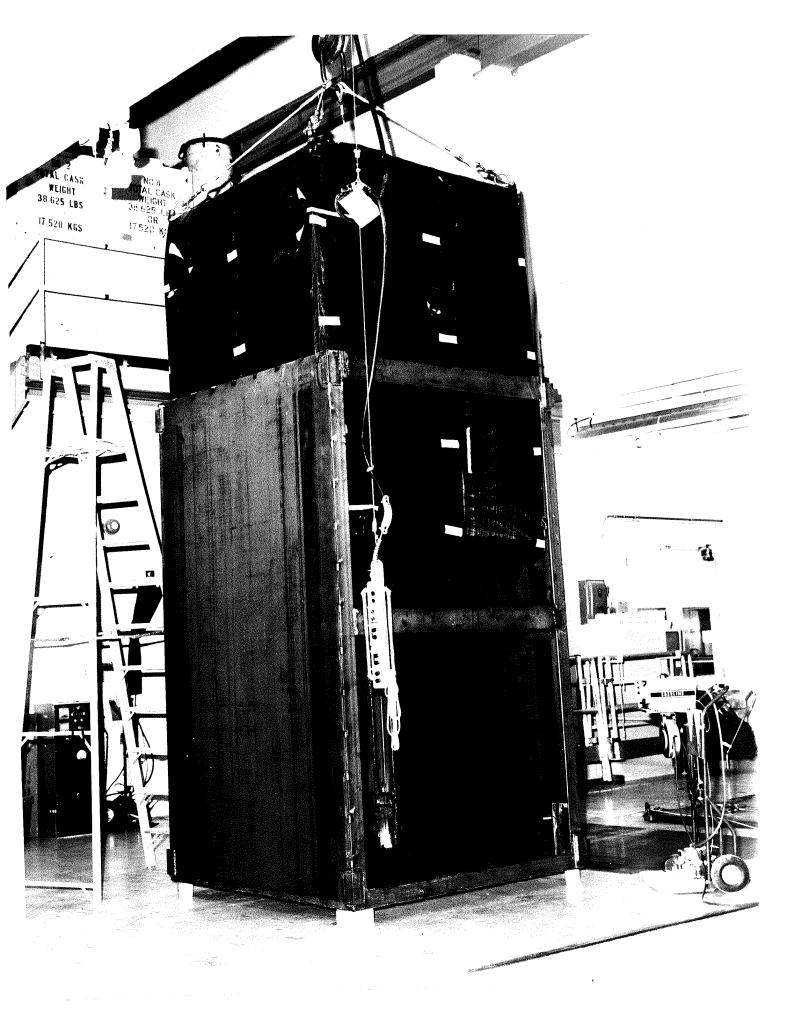
Ratio to Cs-137

Nuclide Sr-90 Y-90 Ru-106 Rh-106 Sb-125 Te-125m	7 Years 91.89% 91.89% 5.43% 5.43% 8.25% 3.42%	10 Years 91.36% 91.36% 0.73% 0.73% 4.07% 1.69%	20 Years 90.34% 90.34% 0.00% 0.40% 0.16%
Te-125m Cs-137 Ba-137m Pm-147		1.69% 100.00% 93.77%	0.16% 100.00% 93.77%
Eu-155	2.35%	5.71% 1.87%	0.33% 1.52%

Ratio to total listed activity (>95%)

Nuclide		7 Years	10 Years	20 Years
Sr-90		22.40%	23.35%	23.97%
Y-90		22.40%	23.35%	23.97%
Ru-106		1.32%	0.19%	
Rh-106		1.32%	0.19%	0.00%
Sb-125		2.01%	1.04%	0.00%
Te-125m		0.83%	0.43%	0.10%
Cs-137		24.38%	25.56%	0.04%
Ba-137m		22.88%	23.96%	26.53%
Pm-147		1.87%	1.46%	24.88%
Eu-155		0.57%	0.48%	0.09%
Nuclide		2.0,0	0.40%	0.40%
Sr-90	No Gammas			
Y-90	No Gammas			
Ru-106	.511 Mev	20 %		

	TIO ANTITIOD		
Y-90	No Gammas		
Ru-106	.511 Mev	20	•
Rh-106	.622 MeV	ĩŏ	-
Sb-125	.430 MeV	30	-
Te-125m	No Gammas	30	•
Cs-137	No Gammas		
Ba-137m	.661 MeV	90	9
Pm-147	.474 MeV	36	-
Eu-155	.086 MeV		
	· -	30	₹
	.105 MeV	20	*



RH-TRU
RADIOACTIVE SOLID WASTE DISPOSAL RECORD

LOS Alamos National Los Alamos, New Me		VOTE: Read instruction	ons on back carefu	ully before completing	ng this form.	
1. Form Number					-	E-7 Waste Management
s 9 1 1 927	00					Ext. 6095, MS J592
	3. Retrievable	4. Origin of Was			I	5. Waste
2. Date	Serial Number	Group		ilding	Wing Program	Codo
	B 119336	MST	5 3	29	1 19 8171	7 4 4 4 1
	617556					4 0 8 0 4
6. Waste Description						
CELL 14	STAIN	LESS S	TEEL	ALPH	4 B 0 X	PACKED
7. Numbers of Waste Pac	ckages	8. G	iross Volume		9. Package Ra	adiation at
Card- Plastic Board	Drums Woode	en Crates	F = fc	neter ³	Surface	1 Meter
Bags Boxes N	lo. Gal. No.	Volume-ft ³ A	mount $\sqrt{G} = g$	allon /	(mr/hr)	(mr/hr)
]	6000 F		6 5 0	. 5 0 .
10. Gross Weight	11. Addition	al Description of Pac	kaging and Pack	aging Materials		
K = kilog P = pour	gram \	4-6-4-4-4-4-4-4-4-4-4-4-4-4-4-4-4-4-4-4	heelmhafar			
Amount \(\tag{T = ton} \)	<i>[</i>	STEEL	BOX		WPRF	00538
2.7 7						
12. Radionuclide Conten	ì					SS Materials Write-Off
		(C = curie)	Error on	3	ount Determined By:	Project
Nuclide	Amount	(C = curie)	Amount	M =	= analysis = measurement = estimate	Account Code
					- estimate /	
U 3 8	34/1010 E	+0 m /	B 00	E+OA		
PU155	7.8 0 0 E	-1 m 4	65 00	E _ / A		
C 5 / 3 7	5+9 5 0 E	-1/6	•	E E		
5 R 9 0	5.4 3 8 E	-16	\ \ \ \ 	E E		
V 9 0 1	5 4 13 18 E	-//c	•	E &		
RU106	1. 2.1.	- 3 C	b	E E		
	<u> </u>	AP	PROVALS			
Waste Generator (Print Name	e Here)	HSE-1/-10/-11 Are	ea Representative (/	Print Name Here)	Additional Signa	itures (Optional)
	BETTER	Kenn.	eth L	Auct		
Signature certifies that the wath at ALL applicable accepta criteria have been met(Signature)	vaste is as represented here a nce and disposal/storage	and Signature certifies handle and transp	that waste package port(Signature)	or shipment is safe to		
criteria have been met(S/g)a	Letter	JK.	Gulf			
13. Date	14. Disposal/Sto	rage Location			15. Shaft S	Surface Dose
Disposed	Area Sh		Post(s)	Layer Pos.	mr/h	r
M M D D Y		016	LTL			
HSE-7 Waste Manageme				Received	Logbook	Computer Verified
Signature Certifies that a	ANDREW J. CAT. II waste redeiving, randling	ANACH g, and disposal/storac	requirements we	pre met. Date	Date	Date Date
(Signature) \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	<u>- V.C</u>	+		12-5-9	1 12-5-91	2/16/9
Form Number HS 10-2A (12/	89)					* *

Atamos National Laboratory

RADIOACTIVE SOLID WASTE DISPOSAL RECORD

os Alamos, New Mex	kico 87545 N	OTE: Read instructions	on back carefully before	e completing this form	HSE-7 Waste	Management , MS J592
s 9 1 0327	00		===			, 100 0002
	3. Retrievable	4. Origin of Waste				5. Waste
2. Date M M D D Y Y	Serial Number	Group	TA Building	Wing	Program Code	Code
_	0119336	MST 13	3	219 1 19	X17171A	A 14 1
6. Waste Description						
C E L L 1 4	STA1N	LESS ST	EEL A	PHA B	0 X P A	CKED
7. Numbers of Waste Pac	kages	8. Gro	ss Volume	9. F	Package Radiation a	at
Card- Plastic Board	Drums Woode	en Crates	$M = meter^3$ $F = foot^3$			Meter nr/hr)
Plastic Board Bags Boxes N	o. Gal. No.	Volume-ft ³ Am	ount G = gallon /	(1111	7(11)	111/111)
		36	0+0 F		6 5 0+1	5 0
10. Gross Weight	11. Addition	al Description of Packa	iging and Packaging M	aterials		
/K = kilog P = pour	gram \ TIME C	Apsule Attach	ed to box			
Amount $T = 100$			BOX		ORF O	0 5 3 8
247 7					SS Mat	erials Write-Off
12. Radionuclide Conten	it I		*	Amount Dete	rmined By:	
Nuclide	Amount	(M = gram)	error on Amount ±	A = analysis M= measur E = estimat	ement Accou	unt Code
U13 8 1	3 4 / E	+10 m /	8	10 4		
P1415151	748 8	-11 m 4	5 E -	II A		
C 5 1 3 7	5+9151	-1/6	• E	E		
51R19101	5.413 18 1	-16	E	E		
V 19 0 1	5.4 13 18		E	ϵ		
		- 3 C	E	E		
RU106	17.0 0 12 1		<u> </u>			
Waste Generator (Print Nam	ne Here)	API HSE-1/,10/-11 Are	PROVALS a Representative (Print Na	me Here) Ad	ditional Signatures (C)ptional)
-	OBETTER	1	JL 1 1A.	1-1		
Signature certifies that the	waste is as represented here	e and Signature certifies	that waste package or ship	ment is safe to		
that Abl applicable accept criteria have been met(Siy)	waste is as represented here tance and disposal/storage patyre)	handle and transp	and signature)			
13. Date	14. Disposal/S	torage Location			15. Shaft Surface	Dose
Disposed			Post(s) La	yer Pos.	mr/hr	
112101519	1 6 3					- Ara Na dia d
HSE-7 Waste Manager	ment Representative (Pri	int Name Here)		Received Lo	gbook Com	puter Verified
Signature destrict that	ANDREW J. CA	MANACH hng. £ng gisposal/storag	requirements were me	t. Date Da	ate Date	Date
(Signature) Form Number HS 10-2A (12	X-\.			12-5-91 (2-5-91 12/	iche

Los Alamos

Los Alamos National Laboratory RADIOACTIV

RADIOACTIVE SOLID WASTE DISPOSAL RECORD

Los Alamos, New Mex		TE: Read ins	tructions on bac	k carefully before	completing this			
1 Form Number	,						7 Waste Ma Ext. 6095, MS	
	northnumber						XI. 6095, IVIS	2 1295
s 9 1 3 (7)		4. Origin o	of Waste				[5. Waste
2. Date	3. Retrievable Serial Number	Group	TA	Building	Wing	Program		Code
MMDDYY		Croup						
6. Waste Description								
7. Numbers of Waste Pac	kages	1	8. Gross Volu	ıme		9. Package Ra	diation at	
Card-	Drums Wooden	Crates		/M = meter ³ \		Surface	1 Met	er
Plastic Board Bags Boxes N	lo. Gal. No. Vo	lume-ft³	Amount	$ \begin{pmatrix} F = foot^3 \\ G = gallon \end{pmatrix} $		(mr/hr)	(mr/t	
							<u> </u>	
			10-1-1-1	- J Dankarian Mai	la riala			
10. Gross Weight		Description (or Packaging a	nd Packaging Ma	CIBID			
Amount K = kilog P = poui T = ton	nd)						1 1 1	
\(\frac{1}{1} = \frac{1}{1} \)							لبلل	
							SS Materia	Is Write-Off
12. Radionuclide Conten	nt				Amount [Determined By:	00 Wateria	1
		(C = curi M = grai	e) Error on	, ,	/ A = ana	lysis \		Project
Nuclide	Amount ±	:	Amount	±	M= mea	asurement) mate	Account	Code
RIL 1/10/6	4.31612 =-	-13 0	1	. E	E			
NATION	17731313							
56125	2412 Z E -	2 C	• 1	E	E			-
TI TI M	1101016	120	1 1	I E	E			
TE125	1006E		P 1					1
BA1/37	5.5 8 1 E-	110	. •	E	E			
					E			
Pm1147	343 19 17 E-	- 2 C	•	E			ļ	
E1011 15 15	/4/ 1/ 13 E-	12 C	1 1	E	E			
		1-1-1			d			
			APPROV	ALS		Additional Signa	aturas (Ostio	noli
Waste Generator (Print Nan	ne Here)	HSE-1/-10	0/-11 Area Repre	sentative (Print Name	e Here)	Additional Sign	atures (Opiioi	riai)
Signature certifies that the	waste is as represented here an ance and disposal/storage	d Signature handle ai	e certifies that was nd transport(Signa	e package or shipme ture)	ent is safe to	-		
that ALL applicable accept criteria have been met(Sign	nature)							

13. Date	14. Disposal/Stora	age Location					Surface Do	se
Disposed	Area Sha	ft Pit	Post(s)	Laye	r Pos.	mr/t	nr T	
M M D D Y	1 6 30	6						
HSE-7 Waste Managen	nent Representative (Print N	Name Here)	-		Received	Logbook	Compute	er Verified
/ ANDAU	EW J. CATANACH				AC	AC		
Signature certifies that	all waste receiving handling	. and disposa	i/storage require	ements were met.	Date 12-5-91	Date	Date	Date
(Signature) \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	(-)-(-)			•	12-5-11	12-5-91		

Form Number HS 10-2A (12/89)

Los Alamos

Los Alamos National Laboratory Los Alamos, New Mexico 87545

RSWD	Retrievable
Form Number	Serial Number
s 19 1/10 13 12 17	0119131316

NONCERTIFIED TRU WASTE SUPPLEMENTAL DATA SHEET

I. Waste Generator's Package Information

Organic Material Weight (lb.)		1/00	0 E	+ /	Organic M	aterial Voiume (%	/6)				
Internal Shielding											
Type Thicknes	s (in.)			****	Nonradio	active Hazardou	s Materia	als			
X None	***************************************			Nan	ne		EPA Co	ode	Qu	antity (g	3)
☐ Lead ● E				NONE						E	
☐ Steel • E			***************************************							E	
☐ Concrete ● E			W. Wallander						*	E	
Other • E			0777 		·····				•	E	
Internal Packaging	Addition	nai Inform	ation								
Plastic bags	C. of		110	1 11		-1 /		/	***************************************	//	
Number	COST	<u>BMINAS</u>	rec s	MINCO	<u> </u>	packed	4 Co	NTAIN	IMEN'	- Do	<u>×</u>
Thickness 3mil	wrap	sped	in p	CASTIC	<u> 4.d</u>	packed	12 0	2 6	f# X	log	<u>/</u>
	X 10	ff	stee(bor	ζ						
90-mil HDPE Liner		V									
Blocking Other	11100	- 1			1				****		
The waste described herein wa						00538	liooblo ro	auiromor	ato of AD	10 E of t	
Los Alamos Health and Safety	Manual.	, packaged The data a	re correct	t anid com	plete to the i	best of my knowle	ilcable re dge.	quirerner	ils of AR I	10-5 01 1	ne
Drinted Nome	BET		Signatu		elei	lu			Date 8/9	9/9/	f
	II. GENI	ERATO	R SITE	HEALT	H PHYSI	CS INFORMA	TION	<u>-</u>			
Gamma Dose rate (mrem/h)	6	5 E	4 2	Survey I	Meter Model	RO-3C	Proper	ty No. 🛭	2026	30	***************************************
Neutron Dose Rate (mrem/h)		• - E	+0	Survey I	Veter Model	PNR-4			0052		
Total Dose Rate (mrem/h)	6	• 5 E	4 2	The data	a in this sect	ion were collected	as preso	cribed in	approved		fures.
Alpha contamination (dpm/100cn	n ²) / (• 5 E	+ 1	Printed	Name K_{ℓ}	mets 1	AL	14	Date 8	9/91	
Beta-Gamma Cont. (dpm/100cm	2) 3	8 E	+ 2	Signatur	$^{\mathrm{e}}$ K	- Cenl	1	y		7	
		2243	I. HSE	-7 AUTI	HORIZAT	ION	/				
The data package for this was	te has beer	n reviewed	by HSE-7	7. The ge	nerator is au	thorized to arrange	e transpo	rtation to	TA-54.	· · · · · · · · · · · · · · · · · · ·	
Printed Name BRUCE T.	REICH		Signatu	re	Dru	IT len	A		Date 8	/12/	91
	IV. REC	EIVING	SITE	- - - - - - - - - - - - - - - - - - -	1 PHYSIC	S INFORMA	TION				
Gamma Dose rate (mrem/h)		₽ E		Survey i	Meter Model	CONTROL OF THE PROPERTY OF THE	Proper	ty No.			
Neutron Dose Rate (mrem/h)		• E			Meter Model		Proper			······································	
Total Dose Rate (mrem/h)		e E				ion were collected	*****************	***************************************	approved	proced	ures.
Alpha contamination (dpm/100cm	n ²) e	1 1	4	Printed I	Name			I	Date	***************************************	
Beta-Gamma Cont. (dpm/100cm ² HS Form Number 10-5B (11/88)	2) •	• E	4	Signatur	е						

LOS Alamos Los Alamos National Laboratory Los Alamos, New Mexico 87545

WASTE PROFILE REQUEST

HSE-8 USE ONLY	٦
Reference Number	٦
00538	

Complete both sides of this form using a black or blue pen. Inadequate information will result in processing delays. Send completed form to: ATTN: WPRF, MS K490

MST-5	Telephone 667-4653	Mail Stop G-742	Technical Area 7A-3	Building 5m-29	Room Wg-9
Marknowledge of Pr					
MSDS Attached	ocess		Chemical/Physical	- CONTRACT OF THE CONTRACT OF	1
		Ţ	Duedness Lot ViletAsia	Analysi	s Attached
Choose one or more	of the items below which	best describes ye	our waste:		
Flammable	Pesticide	Photographic	Spent Coolar	nt Plastics	
Combustible	Beryllium	Sanitary	Aerosol Cana	Filter Me	dia
High Explosive	Asbestos	Radiochemistry	☐ Motor Oil	□Vacuum	Filter Sludge
Oxidizer	Solvent	Paint Waste	Pump Oil	Cement	- 1
Pyrophoric	☐ Waste Rags	Laboratory Tras	h Capacitor Oil	☐ Non-Salv	/ageable
Cyanide	Glass	Metallurgic	UST Remedia	ation Non-Rec	yclable
Heavy Metal	Plating Solution	Scrap Metal	Soils	Building	Debris
Corrosive	☐ Etchant	Medical/Biologic	Environmente		
Additional Description	n (Optional)				
alf	DHA CONTAI	NMENT	DOXES		
General Description C	of Waste (check at least of	ne block for each	column):		
FORM	FLASH POINT (°F)	рН	REACTIVITY	PCBs	
Solid	Less Than 100	2.0 or Less	Unstable	☐ < 50 ppi	n
Cemented Sludge	□100 to 139	2.1 to 12.4	Reacts With		i
Semi-Solid/Sludge	☐140 to 200	12.5 or Greater	``	☐>500 pi	'
Absorbed Liquid	Greater Than 200	Not Applicable	Sulfides	Mo PCBs	
☐ Liquid	None	Mar Applicable	Shock Sensit		
☐Gas			Class A or B		
☐ Multi-Layer	•		Contract Con	,	
Suspended Solids			Non-Reactive		
Powder or Ash					
The Adel of Wall					
Indicate Known Rad	dioactivity Of Your Waste	: List Known	Radioistopes:		
□Not Radioactive (Go	To Next Section)	Determined	By Assay [Determined By Estin	nate
☐ <2.0 nC/g	Alpha	Radiosotope 1	.235 u A	ctivity/Unit of Measure	NA
>2.0 nC/g	⊠ Beta	Radiosotope 2	. 239 Pu A	ctivity/Unit of Measure	1
☐ > 10.0 nC/g	C Gamma	Radiosotope 3	MEP	ctivity/Unit of Measure	
	Tritium	Radiosotope 4	THE TAX PARTY OF THE PARTY OF T	ctivity/Unit of Measure	
GENERATOR CERTIFI	CATION				
	of the waste, and/or chemical/	nhveical analysis I ca	rtifu that the information n	rovided recording the	weete enerified on this
form is correct. I understa	nd that this information will be to the possibility of fines and imp	made available to regu	ulatory agencies and that t	there are significant pe	nalties for submitting
Print Generator's Name (La	st, First Mi)	Z Numbe	Generator's S	Signature	Date
LEDBETTER	E JAMES N	1. 077	1067 Je	Shether	4.27-9
	rdinator is the custodian of you	waste Print Gro	oup Waste Coordinators Na	eme (Last, First Mi)	Mail Stop
management documentatio	n, provide the name and mail st	top of this	, ,	- 11	750
person (optional).			RCIA DAI	ryll	5 100
Form 1346 (4/91)		Page 1 of	2	Come	lete Reverse Side

		her the following	1 to 1 to 1 to 1 to 1 to 1 to 1 to 1 to				
	None			KOP		TCLP C	other • • • • • • • • • • • • • • • • • • •
Arsenic	- 28	☐ < 5.0 ppm	□≥ 5.0 ppm	Z	 –	>□	
Barium		☐ < 100.0 ppm	☐≥ 100.0 ppm		<u> </u>	-	ā
Cadmium	√ f i	☐ < 1.0 ppm	≥ 1.0 ppm	吊	ન		
Chromium	90988888	☐ < 5.0 ppm					
Lead	#			出	닏ㅡ	>⊔	
	H	☐ < 5.0 ppm	≥ 5.0 ppm	里	ᆜㅡ		
Mercury	Щ	☐ <0.2 ppm	☐ ≥ 0.2 ppm	Ψ	\Box —	>□	
Nickel	Ф	्.	≥ 134.0 ppm	Ф	\Box —	>□	
Selenium	Ф	☐ < 1.0 ppm	≥ 1.0 ppm	ф	П—	>□	
Silver	of the	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	西		—>□	ă
Thallium	्र कि	☐ <130.0 ppm	☐≥ 130.0 ppm	ď	吕		님
			organic compan	LYU odo ovietie		> □	LLI
organic Compou	None		organic compou				ted concentration):
Benzene			Пълети	KOP	Analysis		Other
		☐ < 0.5 ppm	≥ 0.5 ppm	Ø	<u> </u>		
Carbon Tetrachio	oride [J]	☐ <0.5 ppm	≥ 0.5 ppm	Ψ	\Box —	> □	
Chlorobenzene	•	☐ < 100.0 ppm		由			
Chloroform	Th .	☐ < 6.0 ppm		币	<u> </u>		
Cresol	芾	☐ < 200.0 ppm	☐ ≥ 200.0 ppm	##	Ħ		
	#			#	닉 ̄	> U	닐
1,4-Dichlorobenz	=======================================	☐ < 7.5 ppm	≥ 7.5 ppm	丑	ᆜㅡ	-> ∐	0 0 0 0
1,2-Dichloroetha		☐ < 0.5 ppm	≥ 0.5 ppm	Щ	\Box —	> □	Ц
1,1-Dichloroethyl	lene 🔲	☐ < 0.7 ppm	≥ 0.7 ppm	0000000000000			
2,4-Dinitrotoluen	• 🗓	☐ < 0.13 ppm		曲	Π	→□	
Hexachlorobenze	ne 🗇	☐ < 0.13 ppm		币	П—	→ □	
Hexachlorobutadi	iene 🗂	☐ < 0.5 ppm	□ ≥ 0.5 ppm	芾	H		
Hexachloroethan	===			#	片		님
	<u> </u>	☐ < 3.0 ppm	☐ ≥ 3.0 ppm	出	ᆜ	→⊔	<u>니</u>
Methyl Ethyl Keto		☐ < 200.0 ppm		Щ.	<u> </u>	> ⊔	
Nitrobenzene	中	☐ < 2.0 ppm	≥ 2.0 ppm	Ф		→□	
Pentachloropheno	બ 🗓	☐ < 100.0 ppm		由		$\rightarrow \Box$	П
Pyridine	币	☐ < 5.0 ppm	≥ 5.0 ppm	币	<u> </u>		a
Tetrachloroethyle		☐ < 0.7 ppm	≥ 0.7 ppm	Ħ	吕		片
•	''''		□≥ 0.5 ppm	#	닠ㅡ	-	닠
Tricklassekhudess			1 1 > U.5 ppm	: 11		>	
Trichloroethylene	' . Щ	4000		크	<u></u>		
2,4,5-Trichloroph	nenol 🌐	☐ < 400.0 ppm	☐ ≥ 400.0 ppm	đ	<u> </u>	> □	
	nenol []	4000			<u> </u>	→ □	
2,4,5-Trichloroph	nenol []	< 400.0 ppm	☐ ≥ 400.0 ppm			->□ ->□ ->□	
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2,4,5-Trichloroph 2,4,6-Trichloroph Vinyl Chloride CHECK ONE Additional haze Co 1. 2. 3. 4. VASTE CLASSIFICA Non-Regula Solid Weste Non-Regula Sanitary We Other Non-I	H ATION e, Non-Hazardo sted Chemical Waste Disposable Was	< 400.0 ppm < 2.0 ppm < 0.2 ppm < 0.2 ppm < 0.4 ppm < 0.2 ppm < 0.2 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm <	> 400.0 ppm > 2.0 ppm > 0.2 ppm >	There are not 5	Below 1	azardous constitu	cuents in this waste. Concentratio
2,4,5-Trichloroph 2,4,6-Trichloroph Vinyl Chloride CHECK ONE Additional haze Co 1. 2. 3. 4. VASTE CLASSIFICA Non-Regula Solid Weste Non-Regula Sanitary We Other Non-I	HATION e, Non-Hazardo sted Chemical Waste Disposable Waste	< 400.0 ppm < 2.0 ppm < 0.2 ppm < 0.2 ppm < 0.4 ppm < 0.2 ppm < 0.2 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm <	≥ 400.0 ppm ≥ 2.0 ppm ≥ 0.2 ppm ≥	There are not 5	Below T	azardous constitu	B or Mixed dous Waste Low-Level Waste Transuranic Waste
2,4,5-Trichloroph 2,4,6-Trichloroph Vinyl Chloride CHECK ONE Additional haze Co 1. 2. 3. 4. VASTE CLASSIFICA Non-Regula Solid Waste Solid Waste Other Non-I	HATION e, Non-Hazardo eted Chemical Waste Disposable Waste Waste Code 2	< 400.0 ppm < 2.0 ppm < 0.2 ppm < 0.2 ppm < 0.4 ppm < 0.2 ppm < 0.2 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm < 0.4 ppm <	> 400.0 ppm > 2.0 ppm > 0.2 ppm >	There are not 5	tive Waste	azardous constitu	B or Mixed dous Waste Low-Level Waste Transuranic Waste



Appendix G

Radioassay Data Sheets for Hot Cell Liner Containers April 2014 This page intentionally left blank.

Low Level Waste Batch Data Report BDR # LALLW2140

Assay Summary Results

	mmary Results				
		TRU	LLW	TRU/LLW	
DrumID	File Reference	nCi/g	nCi/g	Determination	Comments
	031914yoda05		14.10	LLW	CMR High Cs Box in Shaft
S910322	031814yoda04		39.56	LLW	CMR High Cs Box in Shaft
S910327	031314yoda01		33.39	LLW	CMR High Cs Box in Shaft
S912717	031114yoda01		92.93	LLW	CMR High Cs Box in Shaft
S912719	031214yoda01		29.70	LLW	CMR High Cs Box in Shaft
					and a serial share
j					
				1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
				<u> </u>	

Notes

- 1. TRU nCi/g sets to zero the activity of any isotope reported below the detection limit
- 2. LLW nCi/g uses the minimum detectable activity (MDA) when an isotope is reported below the detection limit.

Batch Narrative

These items were assayed on HPGe assay systems. This batch data report (BDR) contains the results of the analysis to determine whether the items are LLW or Suspect TRU waste.

Quality Assurance

The HPGe instruments undergo a quality assurance check each day of use.

Analyst

Kathleen M. Grue macher

Randy D Lucar

(Date)

14

(Date)

Radioassay Data Sheet Assay Conclusion: LLW

S910321		Site ID:	LANL
0		Procedure:	Q2/SNAP
031914yoda05.htm		Software 1:	SnapV1.13, Peak Doctor v1.0
Yoda		Software 2:	
3/19/2014 12:00		Assay Method:	Gamma
5		No. Isotopes:	22
LALLW2140		Item Name:	flat file
2636.8			
2.48E-01	±	6.60E-03	
4.51E-01	±	6.47E-03	
3.72E-02	±	6.42E-04	
1.41E+01	±	2.44E-01	
1.41E+01	±	2.44E-01	
3.90E-02	±	6.49E-04	
8.12E-01	±	1.97E-02	
2.02E-03	±	2.77E-05	
	0 031914yoda05.htm Yoda 3/19/2014 12:00 5 LALLW2140 2636.8 2.48E-01 4.51E-01 3.72E-02 1.41E+01 1.41E+01 3.90E-02 8.12E-01	0 031914yoda05.htm Yoda 3/19/2014 12:00 5 LALLW2140 2636.8 2.48E-01 ± 4.51E-01 ± 3.72E-02 ± 1.41E+01 ± 1.41E+01 ± 3.90E-02 ± 8.12E-01 ±	0

Nuclide	Mass (g)	Activity (Ci)	Activity Uncertainty (Ci)	MDA (Ci)
Am241	3.86E-03	1.34E-02	4.15E-04	
Co60	8.53E-09	9.72E-06	8.57E-07	
Cs137	1.32E-03	1.16E-01	3.60E-03	
Eu154	1.28E-07	3.42E-05	3.05E-06	
Eu155	3.31E-07	1.56E-04	4.83E-06	
Np237	7.88E-05	5.62E-08	1.74E-09	
Pm147	3.04E-08	2.85E-05	8.85E-07	
Pu238	1.26E-04	2.18E-03	6.77E-05	
Pu239	2.09E-01	1.32E-02	4.09E-04	
Pu240	3.67E-02	8.45E-03	2.62E-04	
Pu241	8.75E-04	9.10E-02	2.83E-03	
Pu242	7.64E - 04	3.03E-06	9.41E-08	
Rh106	8.75E-20	3.12E-10	9.67E-12	
Ru106	9.22E-14	3.12E-10	9.67E-12	
Sb125	2.47E-08	2.57E-05	7.97E-07	
Sr90	7.48E-04	1.03E-01	3.20E-03	
Te125m	2.92E-50	5.26E-46	1.63E-47	
U234	1.04E-02	6.55E-05	2.03E-06	
U235	9.32E-01	2.04E-06	6.34E-08	
U236	4.11E-03	2.69E-07	8.34E-09	
U238	5.54E-02	1.88E-08	5.84E-10	
Y90	1.90E-07	1.03E-01	3.20E-03	

Radioassay Data Sheet

Assay Conclusion: LLW

Container ID: S910321 Site ID: LANL
Revision No: 0 Procedure: Q2/SNAP

File Name: 031914yoda05.htm Software 1: SnapV1.13, Peak Doctor v1.0

Detector: Yoda Software 2:

Assay Date and Time: 3/19/2014 12:00 Assay Method: Gamma
Run Sequence: 5 No. Isotopes: 22

Batch Data Report: LALLW2140 Item Name: flat file

Comments	
	*

Evaluation Data for Analyst and Reviewer

Limit Criteria

TRU/LLW 100 nCi/g
PECi 80 Ci
FGE 200 g

Correlations

Suppress All FALSE
Suppress U FALSE
MDA w/Pu >LLD TRUE

Assay Evaluation Values

Radioassay Data Sheet Assay Conclusion: LLW

Container ID: Revision No: File Name: Detector: Assay Date and Time: Run Sequence:	S910322 0 031814yoda04.htm Yoda 3/18/2014 12:00 4	2	Site ID: Procedure: Software 1: Software 2: Assay Method: No. Isotopes:	LANL Q2/SNAP SnapV1.13, Peak Doctor v1.0 Gamma 22
Batch Data Report:	LALLW2140		Item Name:	flat file
Net Weight (kg):	2818.7			
Pu Mass (g):	7.43E-01	±	3.60E-02	
Total Activity (Ci):	1.38E+00	±	3.61E-02	
TRU Alpha Activity (Ci):	1.11E-01	±	3.50E-03	
TRU Conc (nCi/g):	3.96E+01	±	1.24E+00	
LLW Conc (nCi/g):	3.96E+01	±	1.24E+00	
Pu239 Equivalent Activity (Ci):	1.17E-01	±	3.54E-03	
Pu239 FGE (g):	2.48E+00	±	1.10E-01	
Decay Heat (W):	6.12E-03	±	1.53E-04	

Nuclide	Mass (g)	Activity (Ci)	Activity Uncertainty (Ci)	MDA (Ci)
Am241	1.16E-02	4.02E-02	2.27E-03	
Co60	6.15E-09	7.01E-06	1.74E-06	
Cs137	4.07E-03	3.58E-01	2.02E-02	*
Eu154	6.52E-07	1.74E-04	1.22E-05	
Eu155	1.02E-06	4.80E-04	2.71E-05	
Np237	2.36E-04	1.69E-07	9.51E-09	
Pm147	9.39E-08	8.80E-05	4.97E-06	
Pu238	3.78E-04	6.54E-03	3.69E-04	
Pu239	6.28E-01	3.95E-02	2.23E-03	
Pu240	1.10E-01	2.53E-02	1.43E-03	
Pu241	2.63E-03	2.74E-01	1.54E-02	
Pu242	2.29E-03	9.11E-06	5.14E-07	
Rh106	2.71E-19	9.63E-10	5.43E-11	
Ru106	2.85E-13	9.63E-10	5.43E-11	
Sb125	7.63E-08	7.93E-05	4.48E-06	
Sr90	2.31E-03	3.18E-01	1.80E-02	
Te125m	9.13E-50	1.64E-45	9.27E-47	
U 234	3.22E-02	2.03E-04	1.15E-05	
U235	2.86E+00	6.26E-06	3.53E-07	
U 236	1.26E-02	8.27E-07	4.67E-08	
U 238	1.70E-01	5.79E-08	3.27E-09	
Y90	5.85E-07	3.18E-01	1.80E-02	

Radioassay Data Sheet

Assay Conclusion: LLW

Container ID: \$910322

Site ID: LANL

Revision No: 0

Procedure: Q2/SNAP

SnapV1.13, Peak Doctor v1.0

File Name: Detector:

031814yoda04.htm Yoda

Software 1:

Assay Date and Time:

3/18/2014 12:00

Software 2: Assay Method:

Run Sequence: 4

Batch Data Report: LALLW2140

No. Isotopes:

Item Name: flat file

22

Gamma

Comments

Evaluation Data for Analyst and Reviewer

Limit Criteria

TRU/LLW

100 nCi/g

PECi

80 Ci

FGE Correlations 200 g

Suppress All

FALSE

Suppress U

FALSE

MDA w/Pu >LLD

TRUE

Assay Evaluation

WIPP nCi/g

Values

LLW nCi/g

LLW LLW 39.56 ± $39.56 \pm$ 1.24

PECI

OK

 $0.12 \pm$

1.24 0.00

FGE + 2 Sigma

OK

2.69

Radioassay Data Sheet Assay Conclusion: LLW

Container ID: Revision No: File Name:	S910327 0 031314yoda01.htm		Site ID: Procedure: Software 1:	LANL Q2/SNAP SnapV1.13, Peak Doctor v1.0
Detector: Assay Date and Time:	Yoda 3/13/2014 12:00	4	Software 2: Issav Method:	Gamma
Run Sequence:	1		No. Isotopes:	22
Batch Data Report:	LALLW2140		Item Name:	flat file
Net Weight (kg):	2455.0			
Pu Mass (g):	5.46E-01	±	2.42E-02	
Total Activity (Ci):	9.82E-01	±	2.34E-02	
TRU Alpha Activity (Ci):	8.20E-02	±	2.35E-03	
TRU Conc (nCi/g):	3.34E+01	±	9.59E-01	
LLW Conc (nCi/g):	3.34E+01	±	9.59E-01	
Pu239 Equivalent Activity (Ci):	8.60E-02	±	2.38E-03	
Pu239 FGE (g):	1.78E+00	±	7.17E-02	
Decay Heat (W):	4.42E-03	±	1.01E-04	

Nuclide	Mass (g)	Activity (Ci)	Activity Uncertainty (Ci)	MDA (Ci)
Am241	8.50E-03	2.95E-02	1.52E-03	
Co60	1.68E-08	1.92E-05	1.34E-06	
Cs137	2.86E-03	2.52E-01	1.30E-02	
Eu154	5.02E-07	1.34E-04	7.66E-06	
Eu155	7.11E-07	3.34E-04	1.72E-05	
Np237	1.75E-04	1.25E-07	6.42E-09	
Pm147	6.44E-08	6.04E-05	3.12E-06	
Pu238	2.77E-04	4.80E-03	2.47E-04	
Pu239	4.62E-01	2.90E-02	1.50E-03	
Pu240	8.10E-02	1.86E-02	9.61E-04	
Pu241	1.92E-03	1.99E-01	1.03E-02	•
Pu242	1.68E-03	6.69E-06	3.45E-07	
Rh106	1.78E-19	6.32E-10	3.26E-11	
Ru106	1.87E-13	6.33E-10	3.27E-11	
Sb125	5.24E-08	5.45E-05	2.81E-06	
Sr90	1.62E-03	2.24E-01	1.16E-02	
Te125m	4.09E-50	7.36E-46	3.80E-47	
U234	2.27E-02	1.43E-04	7.40E-06	
U235	2.04E+00	4.47E-06	2.30E-07	
U236	9.00E-03	5.89E-07	3.04E-08	
U238	1.21E-01	4.13E-08	2.13E-09	
Y90	4.12E-07	2.24E-01	1.16E-02	

Date: 6/3/

Assay Conclusion: LLW

Container ID: \$910327

Site ID: LANL

Revision No: File Name:

031314yoda01.htm

Procedure: Q2/SNAP Software 1:

SnapV1.13, Peak Doctor v1.0

Detector:

Yoda

Software 2:

Assay Date and Time: Run Sequence:

3/13/2014 12:00

Assay Method:

Gamma No. Isotopes:

22

Batch Data Report:

LALLW2140

Item Name: flat file

Comments	

Evaluation Data for Analyst and Reviewer

Limit Criteria

TRU/LLW

100 nCi/g

PECi

80 Ci

FGE

200 g

Correlations Suppress All

FALSE

Suppress U

FALSE

MDA w/Pu >LLD

TRUE

Assay Evaluation

WIPP nCi/g

Values

LLW nCi/g

LLW

 $33.39 \pm$ $33.39 \pm$

PECI FGE + 2 Sigma

OK OK

LLW

 $0.09 \pm$ 1.92

0.96 0.96 0.00

Radioassay Data Sheet Assay Conclusion: LLW

Container ID:	S912717		Site ID:	LANL
Revision No:	0		Procedure:	Q2/SNAP
File Name:	031114yoda01.htm		Software 1:	SnapV1.13, Peak Doctor v1.0
Detector:	Yoda		Software 2:	
Assay Date and Time:	3/11/2014 12:00		Assay Method:	Gamma
Run Sequence:	1		No. Isotopes:	22
Batch Data Report:	LALLW2140		Item Name:	flat file
Net Weight (kg):	2455.0			
Pu Mass (g):	1.52E+00	±	7.34E-02	
Total Activity (Ci):	2.78E+00	±	7.24E-02	
TRU Alpha Activity (Ci):	2.28E-01	±	7.15E-03	,
TRU Conc (nCi/g):	9.29E+01	±	2.91E+00	
LLW Conc (nCi/g):	9.29E+01	±	2.91E+00	
Pu239 Equivalent Activity (Ci):	2.39E-01	±	7.23E-03	
Pu239 FGE (g):	5.04E+00	±	2.23E-01	
Decay Heat (W):	1.24E-02	±	3.10E-04	

Nuclide	Mass (g)	Activity (Ci)	Activity Uncertainty (Ci)	MDA (Ci)
Am241	2.37E-02	8.22E-02	4.63E-03	
Co60	1.82E-07	2.08E-04	1.14E-05	
Cs137	8.15E-03	7.17E-01	4.04E-02	
Eu154	9.66E - 07	2.58E-04	1.69E-05	
Eu155	2.02E-06	9.51E-04	5.35E-05	
Np237	4.86E-04	3.47E-07	1.95E-08	
Pm147	1.83E-07	1.72E-04	9.69E-06	
Pu238	7.71E-04	1.33E-02	7.50E-04	
Pu239	1.28E+00	8.08E-02	4.55E-03	
Pu240	2.25E-01	5.18E-02	2.92E-03	
Pu241	5.34E-03	5.56E-01	3.13E-02	
Pu242	4.69E-03	1.86E-05	1.05E-06	
Rh106	5.07E-19	1.81E-09	1.02E-10	
Ru106	5.34E-13	1.81E-09	1.02E-10	
Sb125	1.49E-07	1.55E-04	8.74E-06	
Sr90	4.62E-03	6.37E-01	3.59E-02	
Te125m	1.18E-49	2.12E-45	1.19E-46	
U234	6.45E-02	4.08E-04	2.30E-05	
U235	5.81E+00	1.27E-05	7.17E-07	
U236	2.56E-02	1.68E-06	9.44E-08	
U238	3.44E-01	1.17E-07	6.59E-09	
Y90	1.17E-06	6.37E-01	3.59E-02	

Assay Conclusion: LLW

Container ID: S912717 Site ID: LANL
Revision No: 0 Procedure: Q2/SNAP

File Name: 031114yoda01.htm Software 1: SnapV1.13, Peak Doctor v1.0

Detector: Yoda Software 2:

Assay Date and Time: 3/11/2014 12:00 Assay Method: Gamma
Run Sequence: 1 No. Isotopes: 22

Batch Data Report: LALLW2140 Item Name: flat file

Comments			

Evaluation Data for Analyst and Reviewer

Limit Criteria

 TRU/LLW
 100 nCi/g

 PECi
 80 Ci

 FGE
 200 g

Correlations

Suppress All FALSE
Suppress U FALSE
MDA w/Pu >LLD TRUE

Assay Evaluation Values

Assay Conclusion: LLW

Container ID: Revision No: File Name: Detector: Assay Date and Time: Run Sequence: Batch Data Report:	S912719 0 031214yoda01.htm Yoda 3/12/2014 12:00 1 LALLW2140		Site ID: Procedure: Software 1: Software 2: Assay Method: No. Isotopes: Item Name:	LANL Q2/SNAP SnapV1.13, Peak Doctor v1.0 Gamma 22 flat file
Net Weight (kg):	2545.9			
Pu Mass (g):	5.04E-01	±	2.24E-02	
Total Activity (Ci):	9.05E-01	±	2.16E-02	•
TRU Alpha Activity (Ci):	7.56E-02	±	2.18E-03	
TRU Conc (nCi/g):	2.97E+01	±	8.55E-01	
LLW Conc (nCi/g):	2.97E+01	±	8.55E-01	
Pu239 Equivalent Activity (Ci):	7.93E-02	±	2.20E-03	
Pu239 FGE (g):	1.65E+00	±	6.67E-02	
Decay Heat (W):	4.07E-03	±	9.33E-05	

Nuclide	Mass (g)	Activity (Ci)	Activity Uncertainty (Ci)	MDA (Ci)
Am241	7.84E-03	2.72E-02	1.41E-03	
Co60	2.66E-08	3.03E-05	2.00E-06	
Cs137	2.64E-03	2.32E-01	1.20E-02	
Eu154	5.77E-07	1.54E-04	9.19E-06	
Eu155	6.54E-07	3.07E-04	1.59E-05	
Np237	1.61E-04	1.15E-07	5.94E-09	
Pm147	5.93E-08	5.57E-05	2.88E-06	
Pu238	2.56E-04	4.43E-03	2.29E-04	
Pu239	4.26E-01	2.68E-02	1.39E-03	
Pu240	7.47E-02	1.72E-02	8.89E-04	
Pu241	1.77E-03	1.84E-01	9.53E-03	
Pu242	1.56E-03	6.18E-06	3.19E-07	•
Rh106	1.64E-19	5.83E-10	3.02E-11	
Ru106	1.72E-13	5.83E-10	3.02E-11	
Sb125	4.82E-08	5.02E-05	2.60E-06	
Sr90	1.49E-03	2.06E-01	1.07E-02	
Te125m	3.76E-50	6.77E-46	3.50E-47	
U234	2.10E-02	1.33E-04	6.87E-06	
U235	1.89E+00	4.14E-06	2.14E-07	
U236	8.36E-03	5.47E-07	2.83E-08	
U238	1.13E-01	3.84E-08	1.98E-09	
Y90	3.79E-07	2.06E-01	1.07E-02	

Analyst: KM Livet Emacle

Date: 6/3/14

Reviewer:

Assay Conclusion: LLW

Container ID: \$912719

Site ID: LANL

Revision No: File Name:

031214yoda01.htm

Procedure: Q2/SNAP Software 1:

SnapV1.13, Peak Doctor v1.0

Detector:

Yoda

Software 2:

3/12/2014 12:00

Assay Method: Gamma

Assay Date and Time: Run Sequence:

1

No. Isotopes:

22

Item Name: flat file

Batch Data Report: LALLW2140

Comments	 	

Evaluation Data for Analyst and Reviewer

Limit Criteria

TRU/LLW

100 nCi/g

PECi FGE

80 Ci 200 g

Correlations

Suppress All

FALSE

Suppress U

FALSE

MDA w/Pu >LLD

TRUE

Assay Evaluation

Values

WIPP nCi/g LLW nCi/g

LLW LLW

 $29.70 \pm$ 29.70 ± 0.86 0.86

PECI

OK

 $0.08 \pm$

0.00

FGE + 2 Sigma

OK

1.78

Item: Glovebox in Shaft 302 - S910321

File ID: 031914yoda05.RPu

Model

Type: Box

Height (in): 65.00 Width (in): 65.00 Depth (in): 96.00 Volume (ft^3): 234.72

Detector Location
Distance (in): 156.25
Height (in): 32.50

Left of Center (in): 0.00

Detector: Yoda

Collimator: Yoda: ScooBy @356

Waste Matrix: Air (100.00%)

Waste Matrix Density (g/cm3): 9.909E-4

Secondary Matrix: N/A
Package Weight (lbs): 14.52
Packing Efficency: 1.000

Waste Matrix Eff. Density: 9.910E-4

Item Weight: 4200.91 (lbs)

Analyst: Kathleen Gruetzmacher

Notes: lower energy Eu154 peaks less than minimum detectable activity

Wall Material

Primary: Iron 2004 Secondary: Lead Tertiary: None

Wall Thickness (in)
Primary: 0.500000
Secondary: 1.000000
Tertiary: 0.000000

Wall Material Density (g/cm3)

Primary: 7.875E+0 Secondary: 1.140E+1 Tertiary: 0.000E+0

Count Time (sec): 14400 Altitude (ft): 7000.00

Rate Loss Correction Factor: 1.000

Item: Glovebox in Shaft 302 - S910321 File ID: 031914yoda05.RPu

Summary:

. (
Nuclide	Uniform Unifor Activity (Ci) Conc (nCi/g)	Uniform Conc (nCi/g)	Uniform SNM mass (g)	+2s Error (%)
Co60	9.72E-6	5.10E-3	N/A	17.63
Cs137	1.16E-1	6.10E+1	A/A	6.21
Eu154	3.42E-5	1.79E-2	A/N	17.86

Nuclide	Energy (keV)	Yield (gps/dps)	Net Counts (counts)	Bkg Counts Intrinsic (counts) Efficienc (cps/gps)	Intrinsic Efficiency (cps/gps)	Uniform Uniform Activity (Ci) MDA (Ci)	Uniform MDA (Ci)	Uniform Conc (nCi/g)	Uniform MDA Conc (nCi/q)	Uniform SNM mass	+2s Error (%)
Co60	1173.20	9.99E-1	228	322		8.94E-6	3.39E-6	ı	1.78E-3		26.54
Co60	1332.50	1.00E+0	302	166	5.754E-2				1.15E-3	A/Z	17.63
Cs137	661.66	8.52E-1	959497	11874	1.186E-1	1.16E-1	6.18E-5	6.10E+1			6.21
Eu154			139	418					1.36E-2	Y.X	45.31
Eu154		3.55E-1	311	190	6.032E-2	3.16E-5	6.83E-6			A/A	17.86
						i					

Analysis Report for Peak Doctor Version Version 1.0.13.M

Date of analysis: Mar 20, 2014

RobWin has to be here as a token string for SNAP.

Detector Calibration: Yoda

Spectrum ID: 031914yoda05

Analysis Energy Range: 42.055keV to 1999.8keV

Egy(keV)	FWHM	Area	+/-Area	Background
72.81	0.76	168000	698	79765
74.97	0.77	298051	787	80179
84.80	1.01	128073	754	110170
87.37	0.94	38707	678	105332
609.19	0.79	714	147	5256
612.76	0.79	116	146	5303
661.45	1.36	959497	992	5937
723.08	0.97	91	31	211
727.08	0.96	86	30	208
910.91	1.64	447	35	200
964.44	1.74	114	30	192
968.89	1.56	228	30	172
996.42	1.68	89	28	174
1004.93	2.04	139	31	209
1120.22	1.76	236	28	138
1173.21	2.14	228	30	161
1237.90	1.57	115	23	106
1274.51	1.86	311	26	95
1332.58	2.24	302	25	83
1460.83	2.14	3116	57	45
1509.08	1.26	34	11	21
1588.17	2.32	59	14	. 36
1592.53	2.18	151	17	34
1729.46	2.23	62	13	25
1764.63	2.47	279	20	27
1847.30	2.35	47	12	26

*********	********	*****
*	Peak Analysis	*
*********	********	******

Peak			. ,			
No.	Name	P	Branch	Peak	Cont.	Corr.
NO.		Energy	Ratio	Area	Counts	Energy
1	Pb-Kx	72.81	2.77E-01	168000	150520	70.010
2	Pb-Kx	74.97	4.62E-01	298051	159530	72.810
3	Pb-Kx	84.75	1.63E-01		160358	74.970
4	Pb-Kx	87.30	3.91E-02	128073	220340	84.800
5	Bi214			38707	210664	87.370
		609.31	4.61E-01	714	10512	609.190
6	S.F.	N/A	N/A	116	10606	612.760
7	Cs137	661.66	8.52E-01	959497	11874	661.450
8	Eu154	723.36	1.97E-01	91	422	723.080
9	Multi	N/A	N/A	86	416	727.080
10	Ac228	911.21	2.90E-01	447	400	910.910
11	Multi	N/A	N/A	114	384	964.440
12	Ac228	968.97	1.74E-01	228	344	968.890
13	Eu154	996.33	1.03E-01	89	348	996.420
14	Eu154	1004.78	1.79E-01	139	418	1004.930
15	Bi214	1120.27	1.50E-01	236	276	1120.220
16	Co60	1173.20	9.99E-01	228	322	1173.210
17	Bi214	1238.11	5.92E-02	115	212	1237,900
18	Eu154	1274.54	3.55E-01	311	190	1274.510
19	Co60	1332.50	1.00E+00	302	166	1332.580
20	K40	1460.83	1.07E-01	3116	90	1460.830
21	Bi214	1509.22	2.19E-02	34	42	1509.080
22	Ac228	1588.23	3.60E-02	59	72	1588.170
23	D.Esc.3	1592.35	1.00E+00	151	68	1592.530
24	Bi214	1729.58	3.05E-02	62	50	1729.460
25	Bi214	1764.49	1.59E-01	279	54	1764.630
26	Bi214	1847.41	2.12E-02	47		
		TO4/*4T	4.125-02	71 /	52	1847.300

24	PROJECT NAME	yoda	NOTEBOC	OK NO
Zhalm	03/0/4/101	200 000		
11016	03/9/4/06-01	SOUS QUECK	ST TASY-2 Pas	sed
Buctine	031914 yoda B			
TA48	03/9/440001	3/114 (. 5	ST-90#W8012	/ >
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		25/2040	Sellwos/Met. Bellwos/Met. Bs tase = 640 UT S/Cinny)3	
	63/9/4/ /			
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		1/6 = 24 (0)	144"	
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		-2 3 cales 50 /	strugs	
	031914yoda 03	36005 CNT	1 CT-98# W 8012	61
		1.4 = 24 @ 2	347"	-01
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		GW=1714/6	s tare = 688/6	S
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	031914 yocha 04	36003 Cul en	ST-90# W80125	· K
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		GW = 1660/6	25 /2/0= 702) // ₋
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	7 3	eV.		
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i i	READ AND UNDERSTOO		DATE	20
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Item: Glovebox in Shaft 303 - S910322

File ID: 031814yoda04.RPu

Model

Type: Box

Height (in): 65.00 Width (in): 65.00 Depth (in): 96.00 Volume (ft^3): 234.72

Detector Location
Distance (in): 156.25
Height (in): 32.50
Left of Center (in): 0.00

Detector: Yoda

Collimator: Yoda: ScooBy @356

Waste Matrix: Air (100.00%)

Waste Matrix Density (g/cm3): 9.909E-4

Secondary Matrix: N/A
Package Weight (lbs): 14.52

Packing Efficency: 1.000

Waste Matrix Eff. Density: 9.910E-4

Item Weight: 4601.12 (lbs)

Analyst: Kathleen Gruetzmacher

Notes: Eu154 723 keV peak below minimum detectable activity.

Wall Material

Primary: Iron 2004 Secondary: Lead Tertiary: None

Wall Thickness (in)
Primary: 0.500000
Secondary: 1.500000
Tertiary: 0.000000

Wall Material Density (g/cm3)

Primary: 7.875E+0 Secondary: 1.140E+1 Tertiary: 0.000E+0

Count Time (sec): 14400 Altitude (ft): 7000.00

Rate Loss Correction Factor: 1.000

Item: Glovebox in Shaft 303 - S910322 File ID: 031814yoda04.RPu

Summary:

Nuclide	Uniform Unifor Activity (Gi) Conc (nCi/g	Uniform Conc (nCi/g)	Uniform SNM mass (g)	+2s Error (%)
Co60	7.01E-6		N/A	49.64
Cs137	3.58E-1	1.72E+2	N/A	11.28
Eu154	1.74E-4	8.34E-2	N/A	13.96

Detail:

Nuclide	Energy (keV)	Yield (gps/dps)	Net Counts (counts)	Bkg Counts Intrinsic (counts) Efficienc	Intrinsic Efficiency	Uniform Uniform Activity (Ci) MDA (Ci)	Uniform MDA (Ci)	Uniform	Uniform MDA Conc	Uniform SNM mass	+2s Error (%)
					(cbs/gbs)			(nCi/g)	(nCi/g)	(g)	,
Co60	1173.20	9.99E-1	86	212			7.15E-6	4.17E-3	3.43E-3	N/A	53.46
Co60	1332.50	1.00E+0	99	96			3.91E-6	2.55E-3	1.87E-3	N/A	49.64
Cs137	661.66	8.52E-1	576908		1.186E-1		2.78E-4	1.72E+2	1.33E-1	N/A	11.28
Eu154	996.33	1.03E-1	138	366			1.29E-4	9.30E-2	6.20E-2	N/A	43.96
Eu154	1004.78		228	356	7.698E-2		7.19E-5		3.45E-2	N/A	28.78
Eu154	1274.54	3.55E-1	604	146	6.032E-2	1.48E-4	1.45E-5		6.93E-3	N/A	13.96

Analysis Report for Peak Doctor Version Version 1.0.13.M

Date of analysis: Mar 19, 2014

RobWin has to be here as a token string for SNAP.

Detector Calibration: Yoda

Spectrum ID: 031814yoda04

Analysis Energy Range: 42.051keV to 1999.9keV

Egy(keV)	FWHM	Area	+/-Area	Background
72.81	0.80	454139	1016	144706
74.97	0.79	794758	1165	140608
84.80	1.03	332326	1053	193940
87.37	0.93	98301	900	177890
661.43	1.37	576908	771	4567
723.68	2.00	138	44	443
910.97	1.57	251	31	173
968.93	1.28	158	26	128
996.16	1.88	138	30	183
1004.54	1.88	228	31	178
1120.18	1.41	161	23	96
1173.06	1.75	86	23	106
1274.49	1.80	604	30	73
1332.35	1.69	66	16	48
1377.38	1.88	49	16	48
1460.83	2.08	2302	50	38
1592.20	2.07	106	15	31
1764.64	2.16	199	17	21

Peak No.	Name	Energy	Branch Ratio	Peak Area	Cont. Counts	Corr. Energy
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	Pb-Kx Pb-Kx Pb-Kx Pb-Kx Cs137 Eu154 Ac228 Ac228 Eu154 Eu154 Eu154 Co60 Eu154 Co60 Bi214	72.81 74.97 84.75 87.30 661.66 723.36 911.21 968.97 996.33 1004.78 1120.27 1173.20 1274.54 1332.50 1377.66	2.77E-01 4.62E-01 1.63E-01 3.91E-02 8.52E-01 1.97E-01 2.90E-01 1.74E-01 1.03E-01 1.79E-01 1.50E-01 9.99E-01 3.55E-01 1.00E+00 4.02E-02	454139 794758 332326 98301 576908 138 251 158 138 228 161 86 604 66 49	289412 281216 387880 355780 9134 886 346 256 366 356 192 212 146 96	72.810 74.970 84.800 87.370 661.430 723.680 910.970 968.930 996.160 1004.540 1120.180 1173.060 1274.490 1332.350 1377.380
16 17 18	K40 D.Esc.3 Bi214	1460.83 1592.35 1764.49	1.07E-01 1.00E+00 1.59E-01	2302 106 199	76 62 4 2	1460.830 1592.200 1764.640

	23	PROJECT NAME	ydu	NOTEBOOK NO.	
2717	3/8/17	03/8/4/00m91 03/8/4/00m81	300 5 QC CA 9005 BKGCW,	TASO-WERRE	
	TASO	031814y-da 01	FU = 17 WZY	55 gallorder # 69570	
0165	Butan	}	Notrix = Met	bs two=62165	
esc	John Guedenski	03/8/4 juda02	4 sided CNT.	SS Julier durin 6956	7
			1.6.=//@3	letal by take= 6216;	
los		631XIU 1 03	7 s, feet W/	Scelly	
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ek d	gaday	031814 yoda 04	Metrice GI		
124	used		GW= GloveBox uso	11 thistress = 1/2"	
			1/ 4: 17	All thickness 18" Leness = 1/4" tes of lead = 1/4" es of	6
ack					
			BB/		
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20 20 20		SIGNATURE	DOD	DATE 20 DATE 20	
		· ·			

Item: Glovebox in Shaft 306 - S910327

File ID: 031314yoda01.RPu

Model

Type: Box

Height (in): 65.00 Width (in): 65.00 Depth (in): 96.00 Volume (ft^3): 234.72

Detector Location Distance (in): 156.25 Height (in): 32.50 Left of Center (in): 0.00

Detector: Yoda

Collimator: Yoda: ScooBy @356

Waste Matrix: Air (100.00%)

Waste Matrix Density (g/cm3): 9.909E-4

Secondary Matrix: N/A

Package Weight (lbs): 14.52 Packing Efficency: 1.000

Waste Matrix Eff. Density: 9.910E-4

Item Weight: 3800.93 (lbs)

Analyst: Kathleen Gruetzmacher

Notes: None

Wall Material

Primary: Iron 2004 Secondary: Lead Tertiary: None

Wall Thickness (in)
Primary: 0.500000
Secondary: 1.000000
Tertiary: 0.000000

Wall Material Density (g/cm3)

Primary: 7.875E+0 Secondary: 1.140E+1 Tertiary: 0.000E+0

Count Time (sec): 14400 Altitude (ft): 7000.00

Rate Loss Correction Factor: 1.000

Item: Glovebox in Shaft 306 - S910327 File ID: 031314yoda01.RPu

Summary:

Uniform Uniform H2s	1.00 E
	10113 S7+
	(%)
(nCi/g) (g)	
1.11E-2 N/A	13.92
1.46E+2 N/A	10.35
7.77E-2 N/A	11.43
	4/A 4/A

Dotoil.

Detail:					;						
Nuclide	Energy	Yield	Net Counts	Bkg Counts Intrinsic	Intrinsic	Uniform	Uniform	Uniform	Uniform	Uniform	+2s Error
	(keV)	(sdp/sdb)	(counts)	(counts)	Efficiency (cps/gps)	Activity (Ci) MDA (Ci)	MDA (Ci)	Conc (nCi/g)	MDA Conc (nCi/g)	SNM mass (g)	(%)
Co60	1173.20	9.99E-1	485	314		1.90E-5	3.35E-6	1.10E-2	1.94E-3	N/A	16.69
C060	1332.50	1.00E+0	556	136			1.99E-6	1.12E-2	1.15E-3	N/A	13.92
Cs137	661.66	8.52E-1	2083320	22864			8.56E-5	1.46E+2	4.96E-2	N/A	10.35
Eu154	723.36	1.97E-1	324	1396	1.079E-1		7.56E-5	8.04E-2	4.39E-2	N/A	35.93
Eu154	996.33	1.03E-1	297	544	7.764E-2		5.18E-5	8.01E-2	3.01E-2	N/A	26.86
Eu154	1274.54	3.55E-1	1232	204	6.032E-2	1.25E-4	7.06E-6		4.10E-3	N/A	11.43

Analysis Report for Peak Doctor Version Version 1.0.14

Date of analysis: Mar 18, 2014

RobWin has to be here as a token string for SNAP.

Detector Calibration: Yoda

Spectrum ID: 031314yoda01

Analysis Energy Range: 42.154keV to 1999.8keV

Egy(keV)	TOTAL A	_		
	FWHM	Area	+/-Area	Background
72.21	0.83	379502	616	154873
74.37	0.81	660724	813	150726
84.21	1.00	283209	532	201847
86.77	0.95	81962	286	195007
661.34	1.38	2083320	1443	11432
723.10	1.57	324	18	698
873.24	1.47	285	17	359
911.23	1.72	369	19	356
968.90	1.69	177	13	320
996.37	1.61	297	17	272
1004.81	1.78	516	23	294
1120.42	1.93	227	15	195
1173.39	1.78	485	22	157
1274.88	1.90	1232	35	102
1323.53	1.22	73	9	54
1333.02	2.13	556	24	68
1461.37	2.13	2628	51	46
1588.81	2.40	72	8	36
1593.00	2.41	135	12	36
1597.16	2.41	83	9	36
1765.38	2.57	261	16	27

*********	*********	***
*	Peak Analysis	*
********	****	

Peak			Branch	Peak	Cont.	Corr.
No.	Name	Energy	Ratio	Area	Counts	Energy
1	Pb-Kx	72.81	2.77E-01	379502	309746	72.810
2	Pb-Kx	74.97	4.62E-01	660724	301452	74.968
3	Pb-Kx	84.75	1.63E-01	283209	403694	84.800
4	Pb-Kx	87.30	3.91E-02	81962	390014	87.358
5	Cs137	661.66	8.52E-01	2083320	22864	661.457
6	Eu154	723.36	1.97E-01	324	1396	723.166
7	Eu154	873.23	1.15E-01	285	718	873.183
8	Ac228	911.21	2.90E-01	369	712	911.141
9	Ac228	968.97	1.74E-01	177	640	968.764
10	Eu154	996.33	1.03E-01	297	544	996.212
11	Eu154	1004.78	1.79E-01	516	588	1004.645
12	Bi214	1120.27	1.50E-01	227	390	1120.160
13	Co60	1173.20	9.99E-01	485	314	1173.086
14	Eu154	1274.54	3.55E-01	1232	204	1274.493
15	Sum Pk	N/A	N/A	73	108	1323.103
16	Co60	1332.50	1.00E+00	556	136	1332.585
17	K40	1460.83	1.07E-01	2628	92	1460.830
18	Ac228	1588.23	3.60E-02	72	72	1588.166
19	D.Esc.3	1592.35	1.00E+00	135	72	1592.352
20	Eu154	1596.58	1.83E-02	83	72	1596.509
21	Bi214	1764.49	1.59E-01	261	54	1764.591

22	PROJECT NAME Vode NOTEBOOK NO.	23
2/11/14	03111440daQ1 3005 QC act TAS4-2/ussel	
Dre 1	03/11/40da RI 1800 = BKG CNT TASY = 5912717	
BINGER	031114 yoda 01 10,500 s cut in Shaff 305	
landFor	14 = @12'	
Lucis,	Matilx = Glove box	
Galleges	3/11/14 GW=5500 1bs fore = 27001bs	
< hatto	Glove wall twentess - /p"	
7A 54	Container wall thickness for	-
	RB us used three plates of lead	
600/20	3/11/14 = /2 / each	1550
(600) d		
		_
3/12/14	03/2/4 your of 3005 OC UNT TASY-2 Passed 03/2/4 your bl 18005 BKG UT TASY	
18110	031214 yoda 61 1800 5 BEV WI 1859	
Frank 15	03/214, de 01 10,800s cuten shaft 304	
1.611	ch = C12'	
TA54	Matrix = Glove ha	
	Ch. = C/2 Matrix = Glove Ga Gw = tore =	
	Glave wall thickness = 18	
	Costanser wall thickness = 10"	
	(id wall flicturess = 14"	-
7/12/14	used 2 plates of lead = 1/2" each	
3/11/1	03131440 do 01 300 COC CNT TAS4-2-Pass of	
11000	031314yoda 21 3005 QC CNT TAS4-2 Pass of 031314 yoda B1 18005 BKG CNT TAS4-shalts	
Polaret	A 4	910321
Scottf	0313/4yoda01 14,400 s cut on shaft 306	
: TA54	<u> </u>	100
El minimonario en proprio de minimo en el mi	Matrix = Glovebox	
	GW = tore= 6love wall Huckness=1/8"	
in natural negativa, autori norma en naturo, un apabli debia inhabila papara su normo de ser suco des dende e d La compania de la compania del compania del compania de la compania del la compania de la compania de la compania de la compania del la compa	Container wall + 4kkres = 1/5"	
	I'd wall thickness = 1/2"	
	Used 2 plates of lead = 1/2" each	
Applied the anticom contact the endirection and a comment of the endirection contacts and applied to the contact of the endire		
		•
s. ·	SIGNATURE DATE 20	4
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All a sure of the second secon		ALCO AND AND AND AND AND AND AND AND AND AND

Item: Glovebox in Shaft 305 - S912717

File ID: 031114yoda01.RPu

Model

Type: Box

Height (in): 65.00 Width (in): 65.00 Depth (in): 96.00 Volume (ft^3): 234.72

Detector Location
Distance (in): 156.25
Height (in): 32.50
Left of Center (in): 0.00

Detector: Yoda

Collimator: Yoda: ScooBy @356

Waste Matrix: Air (100.00%)

Waste Matrix Density (g/cm3): 9.909E-4

Secondary Matrix: N/A
Package Weight (lbs): 14.52
Packing Efficency: 1.000

Waste Matrix Eff. Density: 9.910E-4

Item Weight: 3800.93 (lbs)

Analyst: Kathleen Gruetzmacher

Notes: Eu154 723 keV peak below minimum detectable activity.

Wall Material

Primary: Iron 2004 Secondary: Lead Tertiary: None

Wall Thickness (in)
Primary: 0.500000
Secondary: 1.500000
Tertiary: 0.000000

Wall Material Density (g/cm3)

Primary: 7.875E+0 Secondary: 1.140E+1 Tertiary: 0.000E+0

Count Time (sec): 10800 Altitude (ft): 7000.00

Rate Loss Correction Factor: 1.000

Item: Glovebox in Shaft 305 - S912717 File ID: 031114yoda01.RPu

Summary:

Nuclide	Uniform Unifor Activity (Ci) Conc	Uniform Conc	Uniform SNM mass	+2s Error (%)
		(II)	(8)	
Co60	2.08E-4	1.20E-1	N/A	10.92
Cs137	7.17E-1	4.16E+2	N/A	11.28
Eu154	2.58F-4	1 49F-1	A/N	13.07

Detail:

Delali.											
Nuclide	Energy (keV)	Yield (gps/dps)	Net Counts (counts)	Bkg Counts Intrinsic (counts) Efficiency (cps/gps)	s Intrinsic Efficiency (cps/gps)	Uniform Uniform Activity (Ci) MDA (Ci)		Uniform Conc (nCi/a)	Uniform MDA Conc (nCi/a)	Uniform SNM mass	+2s Error (%)
Co60	1173.20	9.99E-1	1606	240		1		1.26E-1	5.87E-3	N/A	11.48
Co60	1332.50	1.00E+0	1850	86				1.15E-1	3.05E-3	Ą.	10.92
Cs137	991.66	8.52E-1	33	14616	1.186E-1	7.17E-1	4.68E-4	4.16E+2		A N	11.28
Eu154	996.33	1.03E-1	146	384	1						42.67
Eu154	1274.54	3.55E-1	741	138							13.07

Analysis Report for Peak Doctor Version Version 1.0.14

Date of analysis: Mar 13, 2014

RobWin has to be here as a token string for SNAP.

Detector Calibration: Yoda

Spectrum ID: 031114yoda01

Analysis Energy Range: 42.042keV to 1999.8keV

661.59 1.39 865303 930 7 723.19 1.14 108 10 727.23 0.93 94 10 873.60 1.48 166 13 911.39 1.28 169 13 969.45 1.10 74 9 996.54 1.42 146 12 1005.17 1.73 305 17 1120.84 1.75 166 13	775 539 839
74.52 0.83 1129288 1063 231 84.36 1.02 480400 693 310 86.93 0.99 142008 377 307 510.29 2.41 1378 37 26 661.59 1.39 865303 930 7 723.19 1.14 108 10 727.23 0.93 94 10 873.60 1.48 166 13 911.39 1.28 169 13 969.45 1.10 74 9 996.54 1.42 146 12 1005.17 1.73 305 17 1120.84 1.75 166 13	539 839 788 263
84.36 1.02 480400 693 310 86.93 0.99 142008 377 307 510.29 2.41 1378 37 26 661.59 1.39 865303 930 7 723.19 1.14 108 10 727.23 0.93 94 10 873.60 1.48 166 13 911.39 1.28 169 13 969.45 1.10 74 9 996.54 1.42 146 12 1005.17 1.73 305 17 1120.84 1.75 166 13	339 788 263 308
86.93 0.99 142008 377 307 510.29 2.41 1378 37 26 661.59 1.39 865303 930 7 723.19 1.14 108 10 727.23 0.93 94 10 873.60 1.48 166 13 911.39 1.28 169 13 969.45 1.10 74 9 996.54 1.42 146 12 1005.17 1.73 305 17 1120.84 1.75 166 13	788 263 808
510.29 2.41 1378 37 26 661.59 1.39 865303 930 7 723.19 1.14 108 10 727.23 0.93 94 10 873.60 1.48 166 13 911.39 1.28 169 13 969.45 1.10 74 9 996.54 1.42 146 12 1005.17 1.73 305 17 1120.84 1.75 166 13	263 808
661.59	808
723.19 1.14 108 10 727.23 0.93 94 10 873.60 1.48 166 13 911.39 1.28 169 13 969.45 1.10 74 9 996.54 1.42 146 12 1005.17 1.73 305 17 1120.84 1.75 166 13	
727.23 0.93 94 10 873.60 1.48 166 13 911.39 1.28 169 13 969.45 1.10 74 9 996.54 1.42 146 12 1005.17 1.73 305 17 1120.84 1.75 166 13	111
873.60 1.48 166 13 911.39 1.28 169 13 969.45 1.10 74 9 996.54 1.42 146 12 1005.17 1.73 305 17 1120.84 1.75 166 13	/
911.39 1.28 169 13 969.45 1.10 74 9 996.54 1.42 146 12 1005.17 1.73 305 17 1120.84 1.75 166 13	10
969.45 1.10 74 9 996.54 1.42 146 12 1005.17 1.73 305 17 1120.84 1.75 166 13	22
996.54 1.42 146 12 1005.17 1.73 305 17 1120.84 1.75 166 13	:35
1005.17 1.73 305 17 1120.84 1.75 166 13	.87
1120.84 1.75 166 13	92
100 13	24
	24
1173.87 1.83 1606 40	20
1275.18 1.84 741 27	69
1333.31 2.01 1850 43	49
1461.78 2.08 1632 40	33
1593.85 2.71 88 9	31
1765.83 1.57 152 12	11

*********	**************	* *
*	Peak Analysis	*

Peak			Branch	D = - 1-		_
No.	Name	Enones		Peak	Cont.	Corr.
140.	Name	Energy	Ratio	Area	Counts	Energy
1	D) **	70.04				
1	Pb-Kx	72.81	2.77E-01	643819	475550	72.810
2	Pb-Kx	74.97	4.62E-01	1129288	463278	74.968
3	Pb-Kx	84.75	1.63E-01	480400	620678	84.798
4	Pb-Kx	87.30	3.91E-02	142008	615576	87.365
5	Annih.	511.00	1.00E+00	1378	52526	510.299
6	Cs137	661.66	8.52E-01	865303	14616	661.446
7	Eu154	723.36	1.97E-01	108	1022	722.984
8	Bi212	727.25	6.65E-02	94	820	727.020
9	Eu154	873.23	1.15E-01	166	644	873.243
10	Ac228	911.21	2.90E-01	169	470	910.995
11	Ac228	968.97	1.74E-01	74	374	968.996
12	Eu154	996.33	1.03E-01	146	384	996.059
13	Eu154	1004.78	1.79E-01	305	448	1004.680
14	Bi214	1120.27	1.50E-01	166	248	1120.234
15	Co60	1173.20	9.99E-01	1606	240	1173.210
16	Eu154	1274.54	3.55E-01	741	138	1274.418
17	Co60	1332.50	1.00E+00	1850	98	1332.490
18	K40	1460.83	1.07E-01	1632	66	1460.830
19	D.Esc.3	1592.35	1.00E+00	88	62	1592.767
20	Bi214	1764.49	1.59E-01	152	22	1764.574

22	PROJECT NAME	Voda	NOTEBO	OOK NO	23
2/11/14	031114yodaQ1	3000 QC QCT 7			
BI) CON	031114 yoda 01	10,800 5 007 .	· w shaff	5912717 305	
Lucy	19. Jul	Mat1/x = G	lovebox		
shaft	311111	GW=5500/bs Glove wallfly	いと スクマノ ー ノ	// //	
7A 54		Contained of 11d wall flich the used the	Littles C		
4000		two used the	ree flate	soflerd x	12 Fluck
2/12/14	42/2/4/				5" lead
My ch	The state of the s	11 3005 QCCN		. 1000	
suff P	03/2/4/201	10,800s entien	Shoff#3	5912 7 04	<u> </u>
TRSY		Metsix = Glove	260-		
		Glare wall thinks	tore =		
		1.d wall thickness the	aichaess = 2		
		used 2 plates &	T/cad = 1/2	"each	
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	SIGNATURE		Committee and an experience of the contract of		
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4					

Item: Glovebox in Shaft 304 - S912719

File ID: 031214yoda01.RPu

Model

Type: Box

Height (in): 65.00 Width (in): 65.00 Depth (in): 96.00 Volume (ft^3): 234.72

Detector Location
Distance (in): 156.25
Height (in): 32.50
Left of Center (in): 0.00

Detector: Yoda

Collimator: Yoda: ScooBy @356

Waste Matrix: Air (100.00%)

Waste Matrix Density (g/cm3): 9.909E-4

Secondary Matrix: N/A
Package Weight (lbs): 14.52

Packing Efficency: 1.000

Waste Matrix Eff. Density: 9.910E-4

Item Weight: 4000.92 (lbs)

Analyst: Kathleen Gruetzmacher

Notes: None

Wall Material

Primary: Iron 2004 Secondary: Lead Tertiary: None

Wall Thickness (in)
Primary: 0.500000
Secondary: 1.000000
Tertiary: 0.000000

Wall Material Density (g/cm3)

Primary: 7.875E+0 Secondary: 1.140E+1 Tertiary: 0.000E+0

Count Time (sec): 10800 Altitude (ft): 7000.00

Rate Loss Correction Factor: 1.000

Item: Glovebox in Shaft 304 - S912719 File ID: 031214yoda01.RPu

Summary:				
Nuclide	Uniform Unifor Activity (Ci) Conc (nCi/g	Uniform Conc (nCi/g)	Uniform SNM mass (g)	+2s Error (%)
Co60	3.03E-5	1.67E-2	N/A	13.23
Cs137	2.32E-1	1.28E+2	ΑX	10.35
Eu154	1.54E-4	8.50E-2	A/N	11.94

Detail:											
Nuclide	Energy (keV)	Yield (gps/dps)	Net Counts (counts)	Bkg Counts Intrinsic (counts) Efficienc (cos/aps)	Intrinsic Efficiency (cps/aps)	Uniform Uniform Activity (Ci) MDA (Ci)	Uniform MDA (Ci)	Uniform Conc	Uniform MDA Conc	Uniform SNM mass	+2s Error (%)
Co60	1173.20	9.99E-1	969	252	6.575E-2	3.11E-5	4.01E-6	1.72E-2	2.21E-3		14.60
Co60	1332.50			126	5.754E-2		2.56E-6	1.62E-2			13.23
Cs137	661.66		1435877	17284		2.32E-1	9.93E-5	1.28E+2		N/A	10.35
Eu154	723.36	1.97E-1	259	694	1.079E-1		7.16E-5	8.14E-2			32.95
Eu154	996.33	1.03E-1	289	498	7.764E-2		6.62E-5	9.87E-2	3.65E-2	A/N	26.62
Eu154	1274.54	3.55E-1	1000	190	6.032E-2	1.36E-4	9.10E-6	7.47E-2	5.02E-3	N/A	11.94

Analysis Report for Peak Doctor Version Version 1.0.14

Date of analysis: Mar 18, 2014

RobWin has to be here as a token string for SNAP.

Detector Calibration: Yoda

Spectrum ID: 031214yoda01

Analysis Energy Range: 42.000keV to 2000.0keV

FWHM	Area	+/-Area	Background
0.82	252110	502	126511
0.80	445647	668	123576
1.01	185531	431	170734
0.93	54214	233	159182
0.81	1421	38	64690
1.38	1435877	1198	8642
0.84	119	11	476
0.91	259	16	347
1.21	255	16	261
1.66	301	17	302
1.70	199	14	254
1.80	289	17	249
1.89	430	21	253
1.69	176	13	157
1.69	596	24	126
1.89	1000	32	95
2.05	633	25	63
2.13	2391	49	46
2.54	103	10	33
2.34	55	7	30
2.27	160	13	19
	0.82 0.80 1.01 0.93 0.81 1.38 0.84 0.91 1.21 1.66 1.70 1.80 1.89 1.69 1.69 1.89 2.05 2.13 2.54 2.34	0.82 252110 0.80 445647 1.01 185531 0.93 54214 0.81 1421 1.38 1435877 0.84 119 0.91 259 1.21 255 1.66 301 1.70 199 1.80 289 1.89 430 1.69 176 1.69 596 1.89 1000 2.05 633 2.13 2391 2.54 103 2.34 55	0.82 252110 502 0.80 445647 668 1.01 185531 431 0.93 54214 233 0.81 1421 38 1.38 1435877 1198 0.84 119 11 0.91 259 16 1.21 255 16 1.66 301 17 1.70 199 14 1.80 289 17 1.89 430 21 1.69 176 13 1.69 596 24 1.89 1000 32 2.05 633 25 2.13 2391 49 2.54 103 10 2.34 55 7

Peak No.	Name	Engage	Branch	Peak	Cont.	Corr.
NO.	Name	Energy	Ratio	Area	Counts	Energy
1	Pb-Kx	72.81	0.777.01	050440		
			2.77E-01	252110	253022	72.810
2	Pb-Kx	74.97	4.62E-01	445647	247152	74.960
3	Pb-Kx	84.75	1.63E-01	185531	341468	84.791
4	Pb-Kx	87.30	3.91E-02	54214	318364	87.381
5	S.F.	N/A	N/A	1421	129380	354.000
6	Cs137	661.66	8.52E-01	1435877	17284	661.442
7	S.F.	N/A	N/A	119	952	671.183
8	Eu154	723.36	1.97E-01	259	694	723.197
9	Eu154	873.23	1.15E-01	255	522	873.258
10	Ac228	911.21	2.90E-01	301	604	911.060
11	Ac228	968.97	1.74E-01	199	508	968.955
12	Eu154	996.33	1.03E-01	289	498	996.096
13	Eu154	1004.78	1.79E-01	430	506	1004.697
14	Bi214	1120.27	1.50E-01	176	314	1120.186
15	Co60	1173.20	9.99E-01	596	252	1173.209
16	Eu154	1274.54	3.55E-01	1000	190	1274.437
17	Co60	1332.50	1.00E+00	633	126	1332.461
18	K40	1460.83	1.07E-01	2391	92	1460.830
19	D.Esc.3	1592.35	1.00E+00	103	66	1592.489
20	Eu154	1596.58	1.83E-02	55	60	1596.720
21	Bi214	1764.49	1.59E-01	160	38	1764.592

22	PROJECT NAME	yoda	NOTEBOOK	NO23
3/11/14	03111440de01	3000 QC CCT	TAS4-2 fusse	L
Treis	031114yadaQ1 031114yadaB1 031114yadaO1	1800 5 BKG CL	TASY SITES	912717
SINGE I	031114 yeda 01	14, 2 @12'	on shall 30	
word for		Matilx= G	-love bex	
- Heges	3711/14	GW=5500/b		
shafts		Cautalned in	1) Holeskusse /2	
7A 54	7	11d well this 3 years used the	Chicos = /4/	Flend
200 gd	3/11/14	= 1/2 each	je proses	
WS				
3/12/14	03/2/4 xark 9	1 300 s ac 4	UT TAS4-2 P	bo 222
Mr. John	03/2/4 x ax a 03/2/4 y ax a 6/	18005 BKG	CET THSY	
Sent 15	03/2/4/201		. 1	
1454		ch = 0/2'		
		Fh. = @/2' Mets/x = G/6 GW:	ucha tare -	
		Glace wall there	ness = 18	
and the control of th	The second secon	Costasser wall.	thickness = //	
		used 2 plates	of lead = 1/2"	each de
3/13/14	031214 (00	1 /		
freish 10	0313/4/00 a Q	18005 BKG	WT 7454-she	As The second
Molarath	• 1			
560TT TA54	0313/4yoda01	19905 W1	on shart 30	
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